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CONTENTS.

	PAGE.
News from China	391
Calumet & Hecla Mining Company	391
Union Steel Company	391
Insurance of Workmen	391
Systems of Mining in Soft Ore-Bodies	391
Volcanic Theory of Ore Formation	392
Oxidation of Silicon by Ferrous Oxide	392
Trough Lixiviation	393
Ozokerite	393
Chapin Iron Mine	394
Modern American Methods of Copper Smelting	394
The Pyro-Chemistry of Silver	396
Priority of Labor Claims and Royalty to Mortgages	397
Belgian International Exhibition	397
History of the Siphon Barometer	397
Panama Canal	397
The Nearest Star	397
Eiffel Tower at the Paris Exhibition	397
Steam Engines of the World	397
Utilization of Waste Products	397
Books Received	397
Mining and Metallurgical Patents	397
The Metallurgy of Steel	398
Personals	400
Furnace, Mill, and Factory	400
Contracting Notes	400
Labor and Wages	400

MINING NEWS		MINING NEWS		MARKETS:		FINANCIAL:	
Alabama	401	Ohio	402	Pittsburg	403	Coal	408
Arizona	401	Pennsylvania	402	FREIGHTS	403	Stocks	408
Arkansas	401	Tennessee	402	Metals	404	Boston	408
California	401	Utah	402	Chemicals	404	Baltimore	405
Canada	401	Virginia	403	Iron	404	Birmingham	405
Colorado	401	Wash. Terr.	403	Louisville	404	Deadwood	405
Dakota	401	Wisconsin	403	Philadelphia	404	Pittsburg	405
Mexico	401	MARKETS:		Pittsburgh	408	London	405
Michigan	402	Coal	403	FINANCIAL:		MEETINGS	xiii
Minnesota	402	Boston	403	New York	408	DIVIDENDS	xiii
Missouri	402	Buffalo	403	Advertisers' Index	xvii	ASSESSMENTS	xiii
Montana	402						
Nevada	402						

IN private letters from China we hear that the mining industry is developing and that before long this is likely to be a good field for American engineers and for American machinery. Our correspondent adds: "THE JOURNAL comes to me regularly, and I notice that several others whom I have met take it, and it is generally known as a standard representative of industrial literature—in fact what is called out here a Banner-Man."

THE JOURNAL circulates quite largely in China and Japan, and has been the means of bringing many valuable orders to our manufacturers and engineers.

THE Calumet & Hecla has again met with a serious disaster, as announced in our last issue, by a new fire in the mine. It is stated that the fire is of incendiary origin; that it is very serious need not be said, for every fire in a mine filled with timber is "very serious." That any one should exist who would commit such a crime as to set fire to a mine and deprive so many thousands of his fellows from earning their living seems almost incredible, and we trust will prove untrue, or if true that the miscreant will meet with condign punishment.

Our private telegrams received from the vicinity of the mine to-day state that "the shafts are all closed and carbonic acid gas is being forced into the mine. The situation is said to be now favorable; but this is mere conjecture, which can not be verified until the mine is opened."

Mr. Agassiz is said to take a still more hopeful view and to have announced the fire already out. Though we consider this as premature, it is reasonable to conclude that previous experience will aid in extinguishing this fire.

The effect on the copper market will of course be to increase prices, for this will still further reduce the copper production for this year, and it will tend to lessen the profits of the company. If, however, it should lead to the adoption of a better system of mining which would render the recurrence of such accidents impossible, the saving would quickly compensate for the loss occasioned by the fire.

No excuse is needed for so constantly referring to the wonderful records in furnace and mill practice achieved by our American engineers, for each succeeding one surpasses the previous one, and all surpass anything in any other part of the world. We record them with a pardonable pride, which we reflect for the entire profession, and with congratulations to those who have done the work.

The Union Steel Company, of Chicago, remodeled by its manager, our distinguished engineer, Mr. ROBERT FORSYTH, has again surpassed itself.

In the week ending November 19th, and in which both mill and steel-works worked the usual eleven turns, it made 6022 tons ingots and 5212 tons rails.

The product of the twenty-four hours ending 6 A. M. November 19th was: For the steel-works, 1294 tons of ingots in 128 blows, and for the mill, 4323 rails, making 1154 tons.

The best twelve hours' work on ingots was the night turn of November 18th, when 65 blows were made, yielding 657 tons.

The best twelve hours on rails was the day turn of November 18th, 2218 rails having been rolled, making 592 tons.

Of the 1154 tons of rails rolled in twenty-four hours, 1080 tons were rolled direct from the ingot and 74 tons from reheated blooms.

During the week two changes of rolls were made.

INSURANCE OF WORKMEN.

There is certainly no man who has ever had the control of a large number of workmen, whether in a mine or a factory, who has not at some period of his life been absorbed by the question of insuring them against accident, injury, or death, in some equitable way, which while it will not impose too serious a burden upon the individual, shall yet be of the utmost benefit to the entire community. Few problems are more difficult, and few have been the object of more experimental philanthropy, for we have hosts of benevolent societies, friendly societies and mutual insurance clubs, organized for the express purpose of providing for that rainy day of which the average workingman is so regardless; besides, innumerable public corporations which find in insurance against accidents, a profitable investment for gigantic capital.

That a true solution still remains to be found appears to be indicated by the most recent departure in this direction, taken in Germany, where the government itself has now enacted a law, according to which every person employed will henceforth be insured against accident or death by a great public fund, furnished at the joint expense of the employers of labor, and of the nation, and without any recourse to, or contribution from, the workers themselves. How far such a system can ever be made to work satisfactorily, how far it will lead to carelessness, shamming, fraud, and improvidence, it is impossible to predict; that is to say, so far as Germany is concerned.

The government of that country regards itself in the light of a great, fostering, and benevolent paternity, with the population for its children; and it apparently seeks to inspire, rather a feeling of entire dependence, than a sentiment of self reliance in the mass of its laboring classes. In our own land no such organization is necessary, or possible; it would be incompatible with those ideas of freedom and self-help inborn in every citizen of whatsoever degree or station, and in direct contravention of the sublimest principles of our constitution. What we have to do—what we are doing—is to teach our working men as a class, to be less improvident, to think more deeply of their personal responsibilities, as citizens, husbands, and fathers, and to make provision of their own free will and among themselves, during the days of their youth and strength, for the inevitable coming of sickness and infirmity. We shall, nevertheless watch the working of the German movement with the keenest interest, for it will, no doubt, teach many valuable lessons in its development.

THE SYSTEMS OF MINING IN SOFT ORE-BODIES.

The difficulties experienced in working the large deposits of soft hematite iron ores of Lake Superior, great even when the mines were shallow, have increased rapidly as greater depth has been attained, until it is now pretty generally conceded that none of the methods of mining thus far tried, can possibly be considered as successfully and economically overcoming them.

The ore in these soft deposits is usually, though not always, hard enough to run a drift through it without timbering. It is softer when first

opened, and when very wet, than after it has been drained. It is mostly "picking ground," and at times is so soft that a six or eight-foot drift has to be timbered and lagged. The first and by far the cheapest method of mining these soft ore-bodies, was from open pits. Unfortunately, this system can be applied only to large deposits, which come up so near the surface as to make stripping possible.

In the Gogebic, and in some other districts, it is probable that several of the large mines that are working underground would have found it advantageous to have carried stripping to a much greater extent than they have, both because it saves the heavy cost of timbering, and because it allows to be extracted with closer sorting all the ore, than is practicable underground.

When recourse was had to underground work the usual method of Cornish stull timbering was used until the width of the vein became too great to permit of it. Then rooms of 20 to 30 feet in width were driven across the vein, leaving pillars of ore standing between the rooms to help to support the roof. The rooms are timbered with square sets, and the item of timbering alone costs under this system of mining from 35 cents to more than 50 cents a ton. At the Chapin mine this cost was, we believe, not far from 52 cents a ton, a figure far too high for a normal ore markets. The loss of ore in pillars, and ribs between levels, amounting to from one third to two thirds of all the ore in the deposit, again increases the cost of the ore extracted by having to charge the entire cost of dead-work, shafts, etc., to about half the ore in the mine.

Since it was impossible to carry the roof on timber alone, or on timber and pillars of ore so soft that they had to be lagged up to keep them from crumbling, the next step was to fill the timbered rooms with waste rock from the mine, or gravel, etc., sent down from the surface. This method is now being tried by some of the companies, but it increases the cost far beyond the limits which the market for ores will permit, and moreover, does not allow of the extraction of all the ore in the pillars, which might otherwise compensate for this heavy cost. Again, the size of the timbering has to be increased as depth is attained, and such timber becomes more expensive and rare as the necessity for it increases. Even now, while the Gogebic mines are surrounded by virgin forest, the cost of square sets delivered on the cars at Hurley, where there was recently a mill for making them, was $6.50 per set of two props and two caps, making not less than 500 feet board measure.

It may be assumed as a starting point in iron ore mining that no system which involves the use of timber costing 50 cents or over, per ton of ore extracted is applicable, for in the future our mines will always be able to furnish the quantities of ore that may be required, and competition will undoubtedly reduce prices to a figure which will not permit of such an expenditure.

The perusal of Mr. LARSSEN'S paper on the Chapin mine, published on another page, will be found very instructive. The Chapin has tried nearly every known method of work, and even the system now in use, of working out the ore in sections from the bottom up; as described by Mr. LARSSEN, does not appear to us to contain the elements of permanent success, so that we shall not be surprised to find still another system tried.

The chief drawback to the present system which suggests itself on reading Mr. LARSSEN'S description and still more on examining the mine, is the enormous amount of dead-work done; in 1886, this amounted to 10,159 feet of drifts, 1,938 feet of winzes, and 242 feet of shafts—for an output of less than 200,000 tons of ore.

Next come the practical difficulties of working on a sinking packing underfoot, and with the entire vein overhead following down, breaking the unevenly supported timbering, making it impossible to hold a drift open for any length of time, even with close timbering, and necessitating the loss of all the timber used. These added to the high cost of filling the space excavated, make this system necessarily expensive, and for many evident practical drawbacks it presents the single advantage of getting very nearly all the ore.

The experience at the Chapin points, we think, to a radically different solution of the problem, and of this we may speak on another occasion.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

The Volcanic Theory of Ore Formation.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The interesting "gem of scientific knowledge" given on page 326 of the ENGINEERING AND MINING JOURNAL for November 5th, has an older and higher ancestry than the source from whence your article was taken. On page 533 of "Coal, Iron and Oil; or the Practical American Miner," a plain and popular work on our mines and mineral resources, and a text-book or guide to their economical development, by Samuel Harris Daddow, practical miner and engineer of mines, and Benjamin Bannan, editor and proprietor of the *Miners' Journal*, it is stated: "We are aware that all our sedimentary rocks were formed in water, and that the materials forming them are the results of volcanic action. The logical sequence is that those volcances either existed in water or vented their lava into it. Metals are always heavier than their matrix, or the earthy strata in which they are found; thus, if the lava contained a large amount of metal it would be the first to be precipitated to the bottom of the water into which the lava was vented. The lava would not run in a solid stream from the crater and solidify as a stratum in the water, but the moment it touched the adverse element it would be shivered to atoms and thrown back into the atmosphere with the steam it would create, and the lighter portions would naturally arise in dust and ashes, and be carried, by winds and waves and tides, to remote localities, while the heavier material would be precipitated in the vicinity in the order of their density. This can scarcely be called a theory, since it is a natural process, and one that we know must have occurred. . . . We may refer most of our great Azoic beds of magnetite and specular ores and red oxides of iron to this cause, and their formation to these agencies. We may also refer the alluvial or drift gold in the 'placers' of California and the 'diggings' of Australia to the same causes. . . . On reflection, it is evident that we could not expect the same results from volcanic eruptions of later ages, since the lava is either vented only on dry land, or thrown into deep seas beyond our investigation." Attention was called to this theory in the present writer's Geology of the Iron and Copper Districts of Lake Superior, 1880, pp. 16, 17.

The work of Daddow and Bannan is replete with similar "gems," and will richly repay the curious student of geological theories.

The child, small though he be, quoted by you, is an evident improvement on his sire, and perhaps others of your readers can trace his genealogy further. May it possibly have some connection with the theory that meteories were derived from terrestrial volcanoes. (See the writer's Lithological Studies, 1884, pp. 114–116.) M. E. WADSWORTH.

MICHIGAN MINING SCHOOL, HOUGHTON, Mich., Nov. 9, 1887.

The Oxidation of Silicon by Ferrous Oxide.

EDITOR OF THE ENGINEERING AND MINING JOURNAL:

SIR: In compliance with your standing invitation to promptly call attention to any inaccuracies in Mr. Howe's compilation of the "Metallurgy of Steel," I object to the formula introduced in issue of November 19th, page 378:

$$3FeO + Si = 2Fe + FeOSiO_2.$$

Without going into details on the advisability of starting with the equation, $2FeO + Si = 2Fe + SiO_2$, I suggest, in exchange for the above formula:

$$4FeO + Si = 2Fe + 2FeOSiO_2\ (SiFe_2O_4),$$

because it is a question of practical importance whether the resultant compound is a mono or bisilicate slag. The former, containing 70 per cent FeO and 30 per cent SiO_2, is magnetic, and may be expected to correspond in vibration, elasticity, and expansion under heat, *more* with the physical properties of iron and steel, than the feebly or non-magnetic bisilicate, which has only 55 per cent of FeO and 45 per cent of SiO_2.

Whether the circumstance, that, according to the second formula, 25 per cent *less* of Si become oxidized by the same quantity of FeO, is in favor of my suggestion, when the published analytical results of the determination of oxygen in the metal are taken into account, I have not considered, nor would that consideration furnish conclusive evidence.

Respectfully, A. D. ELBERS.

HOBOKEN, Nov. 22, 1887.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The question which Mr. Elbers raises, while an important one in many respects, is here a little beside the mark. It would have little influence on the discussion of the spiegel reaction method of arriving at the proportion of oxygen in blown steel whether the one formula or the other were assumed. The one which I suggested made no pretence to being true: it was merely presented as probably near enough to the truth to give fairly good results when but little silicon and manganese react. Still, a formula known to be wrong should not be put forth, even if its being wrong did not affect the matter in hand. But mine is not that. As to what the true formula is, each one must decide for himself between conflicting vague probabilities. On *a priori* grounds I should be inclined to agree with Mr. Elbers, whose intimate knowledge of silicates gives weight to his opinion. It may well be thought that, in presence of so vast an excess of metallic iron, silicon would not be likely to deoxidize iron oxide so fully as to form the acid bisilicate which my formula implies. But, on the other hand, what evidence we have seems to point, though equivocally perhaps, to an even more acid silicate. We find that the Bessemer slags, converter-spittings, etc., are even more silicious than bisilicate,—50, 50, 52, 53, 47, 52, 47, 81, 78, 81, 64, 63, 73, 76, 61, 64, 46, 52, 47, 47, 53, 58, 56 are the percentages of silica in the first Bessemer slags which I find at hand in my notes. If you object that the slags in the Bessemer process should be more acid than those produced in recarburizing, here is one with 44 per cent of silica accompanying overblown metal. Worse yet, Turner found in the testing machine fracture of basic Bessemer steel, which had been recarburized with ferro-silicon, many small pipes partly filled with a *whitish* silicious powder. The fact that it was whitish strongly suggests that it contained even less iron oxide than my formula calls for.

Thus, while there may be reason for thinking that the slag which forms is less acid than that which my formula calls for, there are certainly reasons for the opposite belief. In medio tutissimus ibis. In making a guess, and my formula pretends to be nothing else, for I know of no safe ground to build on, one between the extremes is safest, and I am inclined to believe, in spite of the high value which I set on Mr. Elbers's opinion, that I have guessed about as near the truth as I can, and near enough for my purpose. Indeed, I doubt if there be any true hard and fast formula: I think it probable that the formula varies, and considerably, with varying conditions.

To Mr. Elbers's objection I must oppose a counter objection. He seems to imply, though I suppose inadvertently, that my statement is an inaccuracy: this it certainly cannot be called in the present state of our knowledge. And does he intentionally refer to my work as a compilation?

HENRY M. HOWE.

BOSTON, Nov. 22, 1887.

Trough Lixiviation.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the ENGINEERING AND MINING JOURNAL of October 8th I noticed that in a communication signed Harry Chaney, A.R.S.M., F.S.C.I. Manchester, A.I.C. London, my new system of leaching (trough lixiviation) (published in your issue of September 10th) is attacked in a way which is calculated to impress upon the reader the idea that my new system is worthless and a humbug. Incompetency is usually overbearing. Mr. Chaney was sent to me about a year and a half ago by an English company as assayer right from a college in England, and the North Mexican mill at Cusihuiriachic, Mexico, was the first one he ever saw. He has no experience. I had him exclusively employed in the assay office, and during the short run of the mill he had hardly acquired the routine of the assay office, still he considers himself competent and condemns the new system in a summary and bold manner. This shows great lack of experience and modesty.

The principle involved in trough lixiviation is of great importance and deserves to be thoroughly investigated by competent parties, and not to be treated and condemned in an off-hand manner by an inexperienced youth.

I have mentioned in my article on Trough Lixiviation of September 10th that the mill of the North Mexican Company was arranged for common tank lixiviation. The ore, which originally contained 16·66 per cent of manganese, soon dropped down to 4 per cent. As no sulphureted minerals whatever were present, the chlorination depended entirely on the manganese, and the decrease in this mineral was of very serious consequences to roasting, and was the cause that the average chlorination did not exceed 73·2 per cent at an average value of the ore of 27·5 ounces per ton. To flux the ore with sulphureted matters was out of question, as none could be had except some pure galena which the Cusi Company exports. Galena, however, not being a desirable addition, I had to treat the ore by itself. The change in the ore caused another difficulty, which subsequently led me to trough lixiviation. The roasted ore hardened in the tanks like cement and prevented the liquid almost entirely from passing through, and made the extraction of the silver impossible. I tried different devices to increase the filtration, but without success. Finally I charged ore and solution together in a temporary erected trough, and found that by passing through this trough (43 feet in length) the extraction was almost complete. I immediately introduced this new device in the mill, but by various circumstances I was obliged to treat the ore directly with solution without previously washing it with water. Instead of an agitator I had a mixing box on the upper end, into which the stream of solution was running. The ore was introduced by means of shovels. Notwithstanding the imperfect arrangement, and the experimental nature of the working, the result was very gratifying, I can say excellent. Not only was the great trouble, caused by the hardening of the ore, which made tank lixiviation impossible, entirely overcome, and I at once enabled to work with the same tank capacity more ore than the battery could crush and the furnaces roast, but the extraction itself was satisfactory considering the circumstances. In judging the efficiency of the new method we have to compare the obtained result with the amount of silver chloride contained in the roasted ore. That in this case the roasting was imperfect, for reasons above stated, and that in consequence of it the total extraction was not satisfactory does not reflect upon the new system.

I followed carefully the results, and observed that in some instances the tailings agreed with the chlorination test, while in others not, which proved that under certain favorable conditions all the silver chloride was dissolved during the short time of 1¼ minutes, which the pulp required to flow from the mixing box to the settling tanks. What these favorable conditions were, I had not found out yet, when I was obliged to close the works for want of ore. Soon after, however, by making some experiments on a smaller scale with some ore from the Cusi Company, and subsequent experiments with other ores, I found the important fact, that a certain proportion of solution and ore has to be maintained in order to produce perfect extraction; that this proportion depends on the character of the ore, and that it is more the volume of the solution than the concentrated state of it which causes the effect.

Not having known yet these important conditions while working the North Mexican ore, no particular attention was paid to the proportion of ore and solution. The irregularity of feeding and the occasional low pressure in the solution reservoir naturally caused great changes in the proportion, and thus irregular results. Notwithstanding this the average of the resulting tailings contained only 1½ ounces more silver per ton than the average chlorination assays called for. The record of this mill-run is the record of the first experiments with a new method, and Mr. Chaney, if he desires to do so, will be able to pick out and publish single tank charges which did not give satisfactory results. A man, however, who would condemn pan-amalgamation or tank lixiviation on account of a few spoiled charges, which came under his notice at his début as assayer, would give testimony of his incompetency. I have described a way by which the new system can be tested in the laboratory, and it is so exceedingly easy for everybody to convince himself of the correctness of the principle involved in trough lixiviation, and the great advantages of the same are so apparent that it is bound to find adoption, and does not need to shun malicious attacks. When I first introduced Patera's method in 1868, I was exposed to similar attacks, and the process was pronounced by certain parties as humbug, still it is at the present time widely adopted.

For reasons above stated, I was forced to introduce trough lixiviation in the North Mexican mill, without having the opportunity of previously thoroughly studying the new method on a small scale; and the results of the different stages of experiments went on the working record. Such early results are usually not selected as a subject for publication, but if Mr. Chaney desires to do so he can do it. They will only demonstrate what I have said above, that they were irregular, but that under certain conditions the extraction of silver chloride was perfect. I did not publish my new system until I had found which conditions were essential for obtaining good and uniform results, and by further experiments had convinced myself of the correctness of the same.

SEPARATING ORE FROM SOLUTION.

His remark that the great drawback to this method is the difficulty in separating the ore from the solution, and that the system is cumbersome and expensive, is without foundation and of no value. Roasted ore, if stirred in water and then left to settle, will separate quickly and the solution will be clear in two or three hours. By letting the solution pass through seven or eight tanks of 12 feet diameter and 4 feet depth, the solution from the last tank will flow out quite clear, especially if the formation of diametrical streams is avoided as described in my article.

With regard to the expensiveness of the new system, I claim that it is by far cheaper than tank lixiviation. In my article I did not call attention to it because I considered it too plain a fact to be commented on; but now, as just the contrary is asserted, I have to say a few words.

The system of trough lixiviation is continuous, and nearly all the operations are automatic. The ore from the furnaces is dumped into bins, wherefrom it is mechanically and evenly charged into several sprays, or rather sheets of water, which enter a perpendicular erected square tube of 12 inches by 12 inches and about 2 feet high in such a way that they cross each other, thus perfectly closing the tube. Further down the tube is another similar arranged spray. The dust caused by the contact of hot ore and water is absorbed by the top and bottom sheet of water, and can not escape, while the generated steam is condensed. The pulp, when leaving the perpendicular tube, enters a grinding machine of similar construction to the "Kegelmühle" used in Europe for grinding coals, and described by Rittinger. This arrangement answers the purpose much better than an agitator, as the latter will not break the lumps as rapidly as required. From under the mill the pulp enters the base-metal leach trough, and is automatically conveyed to the settling tanks. The further operations are minutely described in my article, and I do not need to repeat them.

By this system the whole cooling floor manipulations are avoided, likewise the filling of cars on the cooling floor, and the transportation of the moistened ore to the tanks, also the shoveling out of the tailings from the tanks, which is surely a great saving of manual labor without substituting for it much machinery. It will require two men per shift to bring the ore from the furnaces to the bin, one man in the base metal department, and one man and a helper in the silver-leach department. The stirring of the silver solution in precipitating is done by mechanical stirrers, which do excellent work. The rapidity of the extraction requires more circulation of the solution, which, however, I do not consider a drawback, as it does not require large quantities of solution but only a larger pump, which little extra expense is not in comparison with the great advantages of the new system.

The ore from the Cusihuiriachic Mining Company contains considerable lead, and the extraction by common tank lixiviation requires on an average 9 hours for base metal and 53·8 hours for silver leaching, in all 62.8 hours. It is roasted in Howell furnaces. For the experiment mentioned above I used a solution containing 1·6 per cent sodium hyposulphite.

The roasted ore contained	27.12	ounces silver per ton.
Chlorination test tailings	3 94	" "
Proportion of solution and ore	6 : 1	
The trough tailings after 43 feet run contained.	14·58	" "
The trough tailings after 86 feet run contained.	14·58	" "
The trough tailings after 129 feet run contained	13 70	" "

The increased length of the trough did not improve the extraction much. In order to find out if the quantity of solution, 6 : 1, was insufficient, I continued the experiments with the same ore in the laboratory with the following proportions and results:

8	weights	solution	to	1	of ore	Tailings :	6·56	ounces per ton.
12	"	"	"	1	"	"	5·25	" "
18	"	"	"	1	"	"	4·37	" "
24	"	"	"	1	"	"	4·37	" "

These results show that a certain proportion of solution and ore is required to obtain a satisfactory result, and that for the Cusi ore this proportion is 18 to 1 or probably less, but more than 12 to 1.

The Yedras ore is very calcareous, and offers great difficulties to chloridizing roasting. The ore I used was only partly roasted for the purpose of experimenting with Russell's extra solution. I used a temporary erected wooden trough 150 feet with an inclination of ¾ inch to the foot.

Value of roasted ore	57·6	ounces silver per ton.
" chlorination test tailings	15·0	" " " "

The solution contained ½ per cent sodium hyposulphite.

The trough tailings by using	3	weights	solution	to	1	of ore	15·96	ounces.
" " "	5	"	"	"	1	"	13·98	"

The ore was charged into the trough at the rate of 46 tons per 24 hours. The tailings were taken at the lower end of the trough, where they dropped into the tank. From the time the ore was charged into the mixing box at the upper end until it dropped into the tank it took just 45 seconds, so that the ore was actually only 45 seconds under treatment when the tailings samples were taken, and the extraction was even better than by the chlorination test, which probably is due to the rapidity of the silver extraction from an ore containing caustic lime.

I made several experiments with Yedras ore, using solutions of different strength in different proportions, the results of which, together with those obtained with other ores, I will publish in a more elaborate paper on the same subject. Very truly yours, OTTOKAR HOFMANN.

ALAMEDA, Cal., Oct. 31, 1887.

Ozokerite.—We take the following, in relation to "ozokerite," from the *Revue Industrielle*, according to a recent study made of the mineral by M. Rateau, mining engineer. In its solid form it is fusible at + 62° C., and gives, when distilled, benzine, 2 to 8 per cent; naphtha, 15 to 20 per cent; paraffine, 36 to 50 per cent; heavy oils, 15 to 20 per cent., fixed residue, 10 to 20 per cent. Ozokerite is associated with petroleum; its chemical symbol is C^{30} H^{60}, and its elementary composition, 85.7 per cent carbon and 14·3 per cent hydrogen. It is soft and plastic, with fibrous breakage, and is an excellent insulator for electrical purposes. It is used for the production of paraffine and a white hydrocarbide called "ceresine." Ozokerite is worth from $110 to $120 per ton at the mine. It is only mined in large quantities in Galicia and Moldavia, although found, besides, in the Carparthian Mountains in the Caucasus, and in Utah and Arizona. The annual product is about 25,000 tons.

THE CHAPIN IRON MINE, LAKE SUPERIOR.*

By Per Larsson, Iron Mountain, Mich

(*Concluded from Page* 346.)

In opening new ground, two of the different methods of mining, where rock filling takes the place of the ore, have been employed, viz.: *longitudinal back stoping with filling* (the *Firstenbau* of the Germans) and *transverse back stoping with filling* (*Querbau*). Fig. 4 illustrates the first of these methods, and Fig. 3 the second.

The work preparatory to stoping is about the same in both these methods. From the shafts, sunk in the hanging- or foot-wall, crosscuts are driven to the ore and connected by drifts running some 20 or 30 feet from the ore, either in the hanging- or foot-wall rock. Owing to the regularity of the Chapin ore deposits, these drifts can be run perfectly straight for long distances, at a nearly uniform distance from the ore. In regard to the location of these main drifts, it has been found necessary in the Chapin to place them on the foot-wall side of the ore. An attempt to locate them in the hanging-wall failed. The rock that takes the place of the ore yields somewhat under the weight of the hanging-wall, whereby heavy layers of the latter are broken off from soapy slips running with the stratification. No timber can be put in strong enough to resist the pressure caused by this movement of the ground. The foot-wall drifts have not as yet shown any signs of crushing.

At the time the main levels are driven, smaller drifts are run in the ore, and from time to time connected with the rock drifts for ventilation.

If the ore is firm and not over 20 feet wide, which seleom happens, the full width is mined lengthwise on the trend of the deposit. As the stope advances, filling is trammed from a temporary chute at the bottom of the rock winze in small cars and dumped near the breast of the stope. In this way, shoveling is avoided. To accomplish this, the filling must be kept at least five feet from the roof, or far enough to allow the trammers to pass under with their cars.

Where the ore is wider than 20 feet, the filling must be kept close to the back. The miners then proceed in the following manner: On the first stope different parties commence to work 50 feet from each other in the ore-drift, run parallel with the main level, and make cuts about 8 feet high and 9 feet wide clear across the ore. If the ground is weak, props or sets of light timber are put up as the cuts advance.

These openings are then filled with rock, either before or at the same time as other cuts of the same size are made, alongside of the first ones. A third slice is then taken off, and the second is filled in the same manner; and so on, until the whole first stope is mined out. As the filling must be kept close to the back, in order to prevent caving of the ore, it is necessary to shovel most of it. It should, however, be borne in mind, that as solid ore is mined and loose rock takes its place, and as the specific gravity of the ore is at least 1½ times greater than that of the rock, it is not necessary to handle more than four tons of rock for every ten tons of ore mined. As soon as the filling is put in, it is planked over.

Before work is commenced on the second stope, ore-chutes and rock-winzes must be prepared. Raises to be used for ore-chutes and ladder-ways are made from the side of the main level to the top of the second stope, and cross-cuts are driven into the ore. These chutes could be located in the ore and connected with the main levels by cross-cuts; but as the tramming will shortly be done by machinery, it is preferable to have the chutes open directly into the levels. The ore-chutes are placed 50 feet from one another, and the rock winzes are sunk 100 feet apart from the next higher level.

The first thing to do on the second stope is to connect the rock winze with the cross-cut leading to the ore-chute, after which the ore will be taken out and filling brought in in the manner above described.

A third stope is then prepared and mined in a similar way, and so on until the whole lift is mined out.

On account of the soft character and the great width of the ore, it sometimes cracks off and settles down on the filling. This will not cause must difficulty, if the filling is kept up close to the back on every stope.

If a block of loose ore is met with, it is necessary to put up drift sets and drive laths, in order to keep the ore from running.

The ore-chutes are cribbed up for the first 20 feet large enough to hold about 50 tons of ore, and then narrowed up to a size of 2½ feet square. From this point they are built circular, 2½ feet in diameter, by means of wedge-shaped blocks of wood cut out in the saw-mill. Care is taken in dumping the ore into the chute that it is not allowed to accumulate and rise in this circular part. Ladder-ways are cribbed up on the side of each ore-chute.

The rock mined in drifts and shafts is, of course, used to fill the excavations in the ore. If, however, this rock is not sufficient, a very suitable filling material can be obtained from a sandstone quarry a few hundred feet from the mine. The sandstone is trammed to one of the hoisting shafts, and lowered on one of the balanced cages used for hoisting, to the level next above the lift where the ore is mined. From the shaft it is trammed on this level to one of the rock winzes and dumped. It is then drawn from a temporary chute built at the bottom of this winze, and trammed to its destination.

Up to the present time the ore taken from the ore-chutes has been trammed in one-ton cars by men. Hereafter two-ton cars will be used, and the power will be taken from a pair of 12-inch × 36-inch horizontal Corliss engines placed near C shaft on the sixth level. These engines will be run by compressed air, and will drive two endless ropes, one for the fifth and the other for the sixth level. The speed of the rope will be about 1½ miles per hour.

The levels are provided with two tracks, one for empties and the other for the loaded cars. The empty cars will be coupled to the rope as fast as they come down from the surface, and taken to the end of the track. Here a man will be stationed to move them over to the ore-track. The ore fillers will then stop at the chutes from which the ore at the time is being drawn, and couple them to the rope as soon as they are loaded.

* A paper read before the American Institute of Mining Engineers at the Duluth meeting, July, 1887.

The two main hoisting-shafts B and C are sunk vertically 9 feet × 12 feet inside the timber, and equipped with two balanced cages.

The hoisting-engines, which are placed in stone houses 110 feet from the shafts, have 30-inch × 60-inch double cylinders acting direct on two conical wrought-iron drums of an average diameter of 12½ feet, provided with friction driving-bands and safety brakes.

Considerable ore is also at present raised through the pump-shaft *A*, and another under-lay shaft, sunk lately in the foot-wall near the east end of the mine, for the purpose of hoisting the ore from No. 3 and No. 5 shaft pillars and adjoining room pillars.

The distance from A to B shaft is 750 feet, and from B to C, 775 feet. About 1100 feet west of C and 600 feet east of the western boundary line of the Chapin property, a new combined pumping and hoisting shaft is just being started in the foot-wall. As it will have to be sunk through 98 feet of water-bearing sand and gravel, it has been decided to make use of the Poetsch freezing process. It is thought that this system of sinking shafts will not only make it possible to reach the ledge in a shorter length of time, but will also leave the shaft and the ground around it in a better condition than if any other method were employed. The shaft will be 22 feet in diameter and lined with cast-iron tubing down to the ledge.

During the shipping season, the ore is trammed from the hoisting shafts by machinery and dumped into pockets, from which the railroad cars are filled.

During the winter months it is dumped from a trestle 35 feet high on an ore-dock, which is 1200 feet long and 130 feet wide, and is elevated about 9 feet above the railroad track.

Most of the mine water is raised 500 feet from the bottom of A shaft by two sets of Cornish pressure pumps. The geared pumping-engine at A shaft has two horizontal non-condensing 24 inch by 48 inch cylinders. It works two sets of plungers, 12 inches and 17 inches diameter, raising about 1200 gallons per minute.

The mining machinery at the Chapin, and also at its neighbor, the Ludington mine, is driven chiefly by compressed air furnished by a plant of air compressors located at Quinnesec Falls, on the Menominee River, about three miles from the mines.

This plant consists of three pairs of 32 inch by 60 inch compressors, driven by three independent vertical 48 inch inward flow turbines, and one pair 36 inch by 60 inch compressors, driven by a 54 inch turbine of the same type. The power given out by the turbines is transmitted to the compressor pistons by gearing, the speed being reduced about four times.

The compressors, which were built by the Rand Drill Company, of New York, have water-jacketed cylinders and heads, and hollow pistons for water circulation. Each pair of compressors has independent foundations, the loading being 10 feet high. The spaces between the foundations form tail races for the turbines placed at their upper end.

The water is led to the turbines through iron penstocks 7 feet to 8 feet in diameter from a flume starting a short distance above the fall, the height of which is 47 feet.

The average delivery of air per 24 hours during last year was 1,827,350 cubic feet of 60 pounds pressure and 60 degrees F. temperature. The average speed of the three pairs then running, if time of stoppages be not included, was 29·41 revolutions per minute, and the average pressure in the receiver was 60·84 pounds. The pressure at the mines was from 2 to 3 pounds less.

In conclusion, the following table, showing the effect of labor and powder at the Chapin mine, are presented:

	Effect of labor.						Effect of powder* (in contract work).						
	Tons per man per day.			Feet per man per day.				Drifts.		Winzes.		Shafts.	
Year.	Broken in stopes.	Loaded and trammed in mine.	Loaded and trammed from stock pile.	Drifts.	Winzes.	Shafts.	Tons broken per pound.	Feet driven.	Pounds powder per foot.	Feet sunk.	Pounds powder per foot.	Feet sunk.	Pounds powder per foot.
1884 ..	9·46	23·75	24·4	·513	·479	077	5 96	4,024	2 90	2,208	2 21	620	8·58
1885...	6·37	20 08	25·4	535	·774	·081	..	.....	.....	.....	.....	.....	.....
1886...	6·77	16 40	31·9	·610	·498	·115	5·00	10,159	2·86	1,938	2·18	242	10·13

* Atlantic, with 27 per cent of nitro-glycerine.

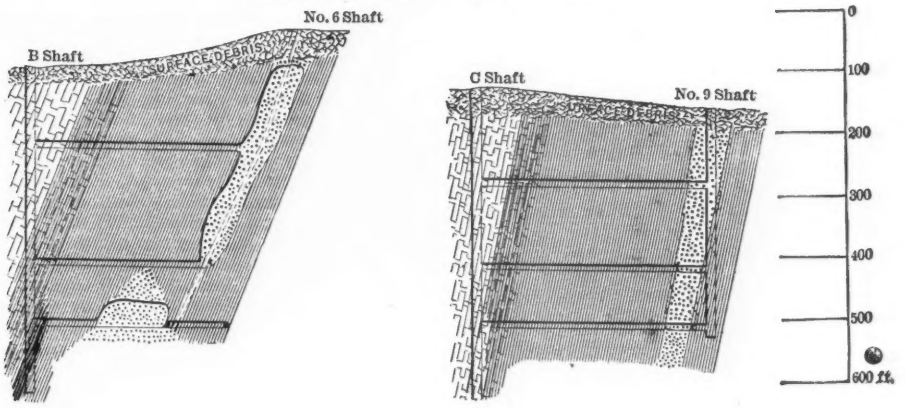
MODERN AMERICAN METHODS OF COPPER SMELTING.

The Rocky Mountain *Mining Review* of Denver, Colorado, dated November 17th, says: "We are in receipt of a very valuable work entitled, "Modern American Methods of Copper Smelting," from the Scientific Publishing Co., of New York. We can not better show how well the work is appreciated than by reprinting from the ENGINEERING AND MINING JOURNAL some opinions given by leading metallurgists."

Moniteur Industriel, of Paris, France, dated November 10th, says: "Cet ouvrage, dû à la plume d'un métallurgiste des plus compétents, a rencontré un très vif succès aux Etats-Unis et sera consulté avec fruit par tous les practiciens. Nous le recommandons sérieusement à ceux de nos lecteurs pour lesquels la langue anglaise n'est pas un obstacle."

The Mexican *Financier* of the City of Mexico, Mex., dated November 12th, says: "Modern American methods of Copper Smelting has been received from the Scientific Publishing Company, New York. Mr. Peters, who was until lately consulting metallugist of the famous Calumet & Hecla Mining Company, is an acknowledged authority on this subject. The book is profusely illustrated, and, as it treats minutely the important subject of the cost of constructing and the expense of operating copper reduction works, it must prove of value. The work contains 342 pages, clearly printed. As an exposition of modern methods and processes Mr. Peters's work must take its place as a standard work on metallurgy."

CROSS SECTIONS, SHOWING GEOLOGY.



LONGITUDINAL BACKSTOPING WITH FILLING, IN CHAPIN MINE.

Scale: 60 feet to the inch.

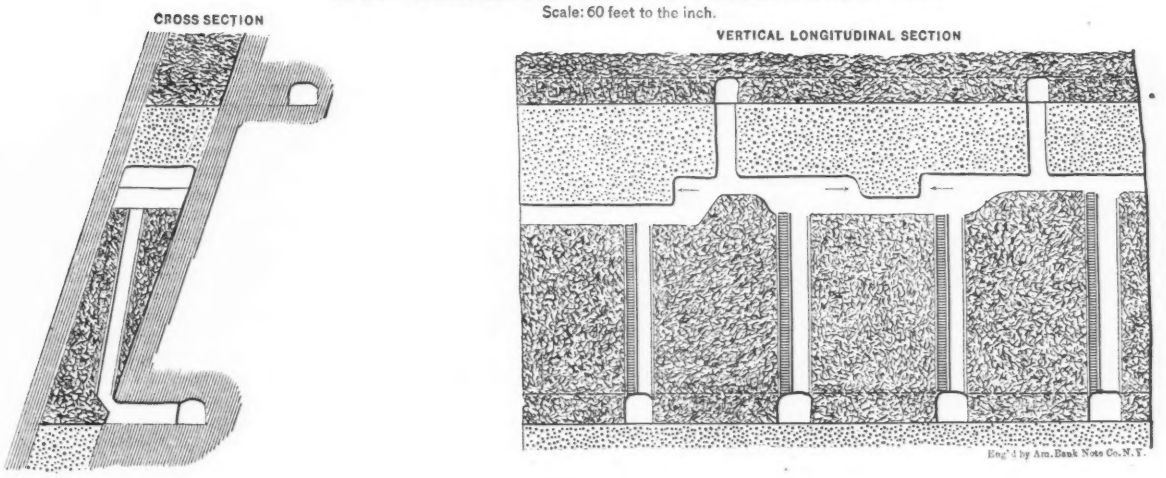


FIG. 4.

TRANSVERSE BACKSTOPING WITH FILLING, IN CHAPIN MINE.

Scale: 60 feet to the inch.

Ore

Slates

Filling

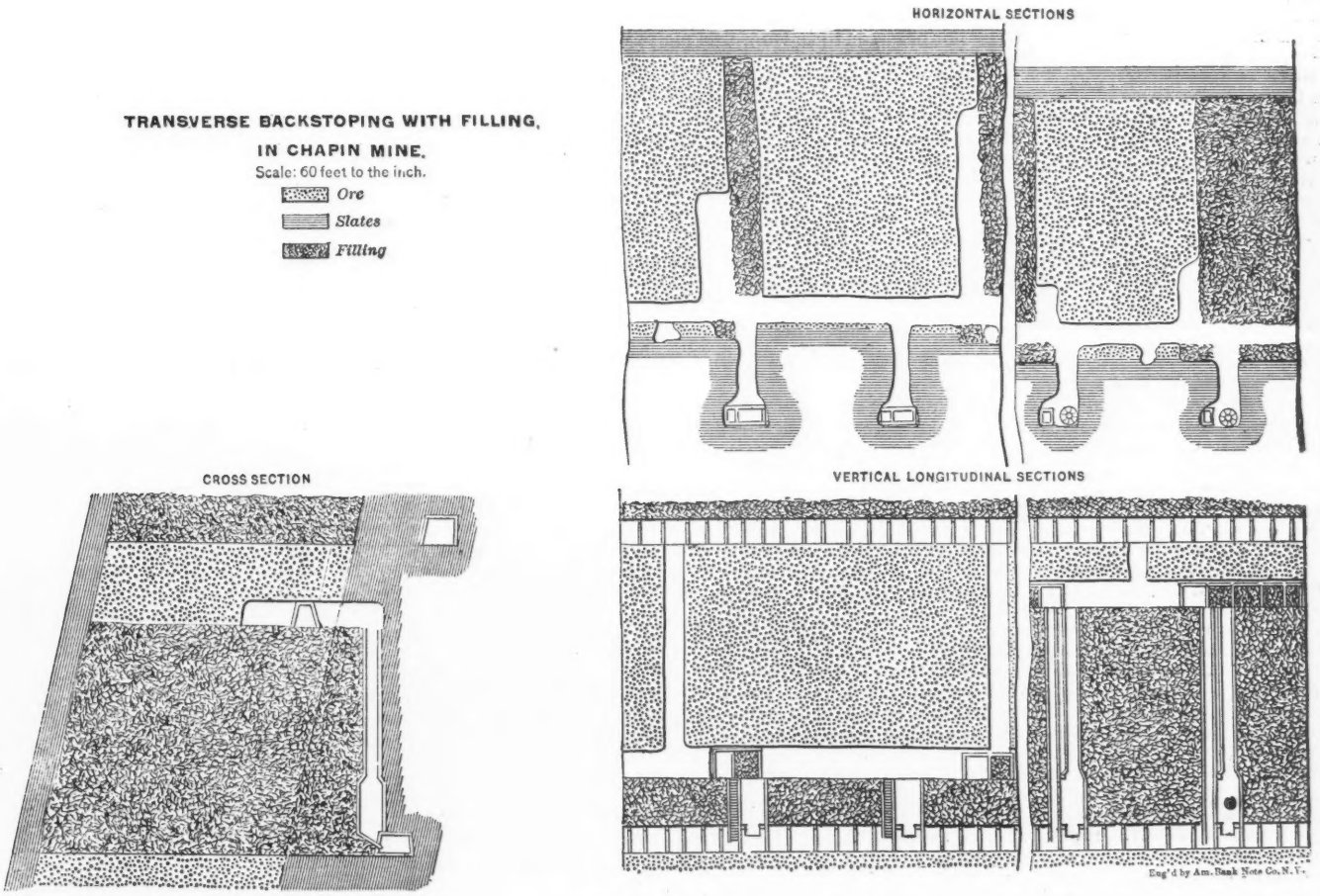


FIG. 3.

THE PYRO-CHEMISTRY OF SILVER.

Written for the Engineering and Mining Journal, by W. M. Hutchings.

I suppose there are few metallurgists who have much to do with silver and who think over their work, who would not admit that there are several little matters connected with its behavior, which are by no means fully explained by any of the statements found in the various text-books.

For instance, there are two questions: "Is there an oxide of silver which is formed at high temperatures?" and "Is there a silicate of silver?" If these questions were put to a number of experienced metallurgists and chemists, we should probably receive from some of them answers in the affirmative, from others in the negative, and from the greater number, a declaration that, so far as present evidence goes, it is not possible to definitely decide either question.

Now, I have observed one or two facts in some of my experience, which appear to have a certain bearing on these two questions, and which, while they had been noticed by other metallurgists of my acquaintance, to many others were totally unknown. I wish to state them here in the hope that some of the keenly observant readers of the ENGINEERING AND MINING JOURNAL may supplement them and explain them, or at any rate give us their views on the subject.

When we are "refining" a batch of silver in the ordinary "English refining furnace," after all the lead is removed by cupellation, we have to continue to strongly heat the metal, with use of more or less blast, for some hours. We are aware that a considerable loss of metal takes place during this stage of the process, though I have found that many people very much underrate the amount of this loss. What is the form in which the silver passes away from the furnace? Is it as metallic vapor, or is it as oxide of silver, or as both together?

Plattner, as is well known, inferred from the experiments detailed in his "Röstprocesse" that an oxide of silver is formed by direct action of oxygen on the heated metal, that this oxide will volatilize, and that at a lower temperature it decomposes again into metal and oxygen. Plattner's experiments were repeated under Percy's supervision by Dick and Tookey, the results appearing to negative some, at least, of Plattner's conclusions. Similar difference of opinion seems to exist as regards the absorption of oxygen by molten silver, it being still quite undecided whether we have simply an absorption of oxygen gas or a solution of silver oxide in the bath of silver.

It appears, however, to be pretty well admitted that oxide of silver is easily formed when the metal is heated by means of the oxy-hydrogen blow-pipe, or even of the common mouth blow-pipe.

Something I had noticed during some laboratory work led me at one time to make the following observations in the flues of silver refining furnaces. I cut some bricks out from the side-walls of the flue at a point where, during the working of the furnaces, a good red heat was maintained, but not high enough to cause any fusion of the fume from cupellation, so that the bricks at this point were not in the least glazed over on the surface. These bricks I well scrubbed with water and a stiff brush, and then dried again. The sides which had been exposed to the flue gases were quite open and porous, like fresh bricks, and after the scrubbing no adherent fume could be detected even with a strong lens. From one such brick I then had the outer face removed to a depth of nearly one millimeter, by means of a rasp, rejecting the powder so obtained. A thickness of 3 millimeters was then rasped off, and the powder assayed for silver and analyzed for lead, the results being: Silver, 0·225 per cent (equals 7¾ ounces per ton): lead, 1·5 per cent. A further layer of 4 millimeters assayed: Silver, 0·032 per cent (10·5 ounces per ton): lead, 0·25 per cent. A still further layer of 5 millimeters assayed: Silver, 0·003 per cent (equals 1 ounce per ton). And a final layer of 10 millimetres assayed: Silver, 0.001 per cent (equals ⅓ ounce per ton).

The lead-tests above given make it quite clear that the silver in the brick does not come from any absorption or entanglement of lead fume as such, even if the examination of the cleaned brick had not quite negatived such a supposition.

Very similar results were obtained from adjoining bricks, some being richer and others poorer in silver. One entire brick was reduced to powder and assayed, giving 0·01 per cent (equals 3¼ ounces per ton) of silver. Bricks further from the furnace, where cooler, gave less silver, and when the point was reached where the heat during working would never attain even a dull red, no silver whatever was found. Bricks nearer to the furnace, which were glazed over, contained no silver except in the actual layer of glaze. These bricks had all been in the flue 18 months. The flue was a large one into which two refining-furnaces worked, but they were not constantly operating.

These tests were made some years ago. I have now quite recently made a similar examination of bricks from another works. From one brick a layer of 7 millimeters was filed off and the powder gave a silver assay of 0·23 per cent. A thin layer taken from another brick (just enough material being removed for the assays) gave 1·25 per cent. In both cases a thin outer skin was first removed and rejected. These bricks are therefore richer than those examined before. They had been longer exposed, over two years, and were in a smaller flue into which two refining-furnaces had worked almost continuously. Equal care was taken to have bricks not in the least glazed and to remove every particle of adherent fume.

Following on these observations I tried the following experiment: During silver-refining, some time after all lead was removed, I had a slab taken off the flue covering, close to the furnaces, and introduced a clean, new, very refractory brick into the flue. It was placed just resting at the ends on two other new bricks, so that it nowhere was in contact with any of the glazed deposit of the flue. It remained in this position during the completion of the refining, some 6 hours, when it was removed and examined. It was not glazed nor in any way altered and no specks of metal could be detected on it. On filing off and assaying the outer skin, it was found to contain a good deal of silver, even after so short an exposure. Before commenting on these observations, I will mention another different case of absorption of silver which has come under my notice.

I was at one time carrying on a series of experiments on some argentiferous copper-matte, during which I had occasion to have a lot of assays made of the raw and calcined material. In one instance, several assays were made by direct scorification of the raw matte, while equal weights were calcined "sweet" in scorifiers, the calcined material transferred to a mortar, mixed with assay litharge and fluxed and assayed. In each case a loss of silver took place to the extent of several ounces per ton, making a very large proportion of the total silver present in the matte. The loss was altogether too large to be due to simply calcining at low temperature, and was for some time a puzzle. It took place equally when the calcined matte was assayed by scorification in another scorifier, but did not take place when scorification was carried out in the same scorifier as served for calcination. Finally, I found that if the matte was removed after calcination, and assay-lead was scorified in the scorifier, the missing silver was always got back.

After calcination no change could be seen on the scorifier save a slight stain on the surface. It was brushed quite clean, but always yielded up silver to assay-lead. Silver had been absorbed from the matte into the material of the scorifier. Other experiments proved that some mattes did not lose silver in this manner, or to a much less amount. The particular matte which gave these more striking losses was rather rich in zinc, while others tried contained little of that metal.

I mentioned this observation to my friend, the late Mr. Frank Williams, of Llanelly, South Wales, who told me he had noticed similar cases of loss of silver, both on a large and small scale, one instance which he gave me being the most striking example I have yet encountered. Some years previously, the firm whose works he was then managing purchased a lot of many tons of a copper-silver alloy containing 85 per cent copper and 15 per cent silver. It was decided to work this lot by itself by calcining the granulated alloy and treating the oxides with dilute sulphuric acid. For the calcination, a new bottom of 4½-inch fire-clay slabs was put into a furnace. At the close of the treatment, during which the strictest care and supervision had been used, there proved to be a serious deficit of silver which could not be accounted for. Failing any explanation of this large loss, Mr. Williams, without any particular reason, took out one of the slabs and had a piece of it assayed. It proved to be immensely rich in silver, and eventually all the missing silver was recovered from the slabs which had been put in new for the calcination hearth.

The material of the slabs, which were very light-colored, did not show any change in appearance, except that the top surface was discolored by the dark oxide of copper, and below this a very faint tinge of green color had been produced, growing fainter as it went deeper into the slab. The silver assay was very high in the upper portions, diminished progressively toward the bottom, but was considerable all the way through. Chemical analysis proved that a very small amount of copper was present, to which the greenish tinge was considered to be due. Mr. Williams gave me a piece of one of the slabs which he had kept. I had it assayed, also tested for copper. The silver amounted to 6·15 per cent, and as this piece was from the interior of a slab, the upper portion must have been very rich indeed.

As I stated at the beginning of these notes, it has seemed to me that the above observations are of great interest in connection with the questions as to oxide and silicate of silver. Concerning the latter combination, there appears to be very little evidence of an experimental nature one way or the other. Stas (as quoted by Percy) heated finely powdered refractory glass and finely divided metallic silver in oxygen, and came to the conclusion that a silicate was formed, oxygen being absorbed, but only at a temperature high enough to soften the glass. Percy points out the obvious defects in the evidence for this, but does not commit himself to an opinion for or against the existence of silicate of silver, and does not appear to have experimented on the subject on his own account.

To return to the absorption of silver by the bricks of the refinery flue, I take it that it may be certainly stated that this absorption is not due to any mechanical adhesion or admixture of "fume" from the cupellation of the silver-lead. It may be due to the action of the volatilized silver of the final stage of refining; it may be due to the constant contact of the outer surface of the brick with the fume driven off during cupellation, which fume, of course, carries off a considerable amount of silver with it; or it may be due to both of these causes. It is pretty certain, I think, that cupellation-fume, like litharge, contains silver in the state of oxide. If the brick takes up silver from this, the silver would appear to pass into the brick, leaving the lead-oxide almost entirely behind, in a manner analogous to what takes place when the silver of the copper-alloy passes into the slabs, leaving the copper oxide behind.

My own impression is that most, if not all, of the absorbed silver is taken up by the flue bricks from what is volatilized during the final stage; and the feasibility of this opinion seems to be confirmed by my experiment with the short exposure of a new brick.

But in what form has the silver entered the brick and penetrated to a considerable depth into it? It is not a case of simple condensation due to decrease of temperature, for this absorption grows less with lower temperature, and ceases wholly where red-heat ceases.

These observations, carried only thus far, are but incomplete, and much more would have to be done to make out conclusive evidence for any particular view, but it seems to me that it would not be very unnatural to surmise, as one explanation, that oxide of silver is formed either by the action of heat and blast on the silver in the furnace, or by subsequent oxidation of volatilized metal in contact with the bricks; that this oxide enters into combination with the silicates and free silica of the bricks, and slowly penetrates into them in this manner.

In the case of the very remarkable absorption of silver from the copper alloy, any merely *mechanical* passage of the metal into the slabs appears quite out of the question, as otherwise the copper would be present with, and in excess of the silver, instead of existing only in mere traces. Here it would appear to be something more than a surmise if one were to suppose the explanation due to an oxidation of the silver, a combination of the oxide with the silicates in immediate contact, and a passing on to deeper layers. A sort of "cementation" process! At the comparatively low temperature at which the copper granules were calcined, it is not likely that any volatilization of silver or of its possible oxide would take place.

Without the hypothesis of a chemical combination, it would be difficult to explain the passage of silver through a mass of fire-clay material 4½ inches thick.

I think if some clever chemist engaged on silver works desires a promising field for investigation he would obtain very interesting results by following up the questions as to the formation of oxide and silicate of silver. Or perhaps these themes have already been noticed, and much more besides, by some one who has had time and opportunity to follow them up and to explain them satisfactorily? If so, what I have written may induce him to give us the benefit of his experience.

BAGILLT, NORTH WALES.

Labor Claims and Royalty Have Priority to Mortgage on Mining Property.—In a recent case—Warren *et al. vs.* Sohn *et al.*—the Supreme Court of Indiana held that where a mortgage is taken on mining property, claims for labor and royalty have priority, and are paramount to the lien of the mortgage, no matter when it is taken or when the claims for labor or royalty accrue.

Belgian International Exhibition.—The Executive Committee of the International Exhibition to be held at Brussels next year, to which we referred in our issue of August 27th, has extended the time in which entries from the United States can be filed to December 31st, and entries must be made before April 15th, and be in their proper order before April 25th. The executive committee is about to establish an agency in New York.

History of the Siphon Barometer.—M. Govi publishes a paper in the *Comptes Rendus*, crediting Torricelli with the first idea, and Pascal with the practical execution and first employment of this instrument, the invention of which has been successively attributed to Robert Hooke, Robert Boyle, and Borelli. He shows that the principle was known to Torricelli in 1644, when he used it to explain to Ricci the theory of the cistern barometer; also that Pascal was acquainted with it in 1653, while Hooke mentions it for the first time in 1665, Boyle in 1666, and Borelli in 1667.

The Panama Canal Practically Dead.—Private letters received in this city from Panama, says the New York *Sun*, state that no work of any importance is being done on the canal. Two leading firms of contractors are said to be embarrassed financially. Another contractor claims over $900,000 from the company. Several judgments have been filed against the Canal Company, and several seizures and sales are advertised. The canal is practically dead already, said a prominent engineer the other day, though the efforts in Paris to galvanize the remains may keep up an appearance of life for some time to come. The importation of the poor Liberians still continues. They are magnificent specimens of manhood, coal black. It was believed that they could resist this death-dealing climate, but the result has proved otherwise. Of the 282 who were the first to be brought there, 36 died within four months,

The Nearest Star.—The distances of the stars are ascertained in the same manner as those of the sun and planets—that is, by parallax. Instead, however, of taking two stations at different parts of the earth's surface, and laying down a base line between them, we take the diameter of the earth's orbit, or 183,000,000 miles, as the base, the observations being taken at intervals of six months. Even with this immense line, however, the parallax is so small that it can only be detected by the most careful observations and accurate instruments. In no case has it been found to be greater than 1 second; and if this be its value, the distance of the star must be 206,000 times as great as the value of the sun. The parallax of about a dozen stars has now been ascertained, and is found to vary between 0·919 sec. and 0·046 sec. The star α Centauri is the nearest to the earth, and its distance is estimated at 20,496,000,000 miles; while the average distance of stars of the first magnitude is probably three or four times as great as this. These figures, however, fail to convey to the mind any definite idea as to the real distance; perhaps the best mode of expressing it is by stating that light, with its speed of 184,000 miles a second, takes 3½ years to travel from that star to us, while the smaller telescopic stars are so remote that it must require upwards of 5000 years for their light to reach us.

The Eiffel Tower at the Paris Exhibition.—This immense tower constitutes the great attraction of the work now going on in preparation for the next great International Exhibition in the Champs de Mars. It is to be 300 meters in height (975 feet), has already attained 31 meters of solid construction, and the scaffolding reaches to 67 meters. It is supported by four basements, between which a fountain will play. The depth of the foundations is 33 meters, and below the ground may be seen the ventilator for the elevator, which is to replace the 2800 steps that would have been required without this mode of locomotion. In this subsoil space a kitchen is to be installed to serve the restaurant that is to be erected at the summit of the tower. The structure is expected to be completed in less than a year. The estimated cost is 10 millions of francs ($2,000,000), of which four millions is defrayed by the promoter, M. Eiffel, and six millions by the city of Paris. After a lapse of twenty years it is to revert to the state. M. Eiffel, who is aided by two engineers and an artistic architect, has achieved well-merited fame by the Careibi bridge, in Auvergne, and the Portos bridge, in the Peninsula. At present 200 men are employed in the construction, working twelve hours a day, at wages from 10 to 20 cents an hour. Some Italians and Belgians are among the number. Half-time obtains on Sunday, as it was found that if carried on during the afternoon the men were slipshoody and went off to drink. As yet there has been only one minor accident, and it is hoped that, owing to the precaution of covered platforms, casualties will be avoided. The tower when finished will be more than double the height of the Great Pyramid.

The Steam Engines of the World.—According to the Bureau of Statistics in Berlin four fifths of the engines now working in the world have been constructed during the last twenty-five years. France owns 49,590 stationary or locomotive boilers, 7000 locomotives, and 1850 boats' boilers; Germany has 59,000 boilers, 10,000 locomotives, and 1700 ships' boilers; Austria, 12,000 boilers and 2800 locomotives. The force equivalent to the working steam engines represents—in the United States 7,500,000 horse-power, in England 7,000,000 horse-power; in Germany, 4,500,000; in France, 3,000,000; and in Austria, 1,500,000. In these figures the motive power of the locomotives is not included, whose number in all the world amounts to 105,000, representing a total of 3,000,000 horse-power. Adding this amount to the other powers we obtain the total of 46,000,000 horse-power. A steam horse-power is about equal in some work to three actual horses' power, if we take into account the continuous working of an engine and the short turn work of a horse; and a living horse is equal to seven men. The steam engines of the world represent therefore approximately the work of 1,000,000,000 men, or more than double the working population of the earth, whose total population amounts to 1,455,923,000 inhabitants. Steam has accordingly trebled man's working power, enabling him to economize his physical strength while attending to his intellectual development.

The Utilization of Waste Products.—The persistent manner in which attention has been drawn to this important subject in the ENGINEERING AND MINING JOURNAL finds an echo in a very able lecture recently delivered before the Philosophical Society of Sheffield, Eng., by Mr. A. H. Allen. In the course of his observations he said it was not so long ago that blast-furnace gases were allowed to burn freely at the mouths of the furnaces, and the utilization of them for heating the boilers and blast is a distinct step in advance. With furnaces consuming coke this is all that can be done, but the successful utilization of the tar and ammonia condensable from furnaces consuming bituminous coal is a further step of great practical importance, We must not forget the enormous quantities of slag which form another secondary product of the reaction in the blast-furnace. It is calculated by good authorities that 25 cwt. of blast-furnace slag is produced for every ton of pig-iron obtained, which in England would mean an average yearly production of 8,000,000 tons of slag. The space occupied by this mass would, when loosely tipped, be nearly twice that of the Great Pyramid, while the bulk of the pig-iron would only be about one sixth of the size of the pyramid. The enormous quantity of this material produced has doubtless stood in the way of its utilization, and where there is a constant demand for it for road-making purposes at a fairly remunerative rate there is not much encouragement to go further with it. At Middlesborough, however, it has been found of great service in the construction of the breakwater at the mouth of the Tees, for which purpose about 500,000 tons of slag are used annually. Again, slag-wool is now being manufactured at the rate of 15 to 20 tons per week. It is used as a non-conducting material for covering boilers, and so forth, and to put under flooring to deaden the sound. At the works of the Britain Glass Company, in Northamptonshire, blast-furnace slag is run in a molten state into a glass-furnace, heated by Siemens gas, and is then mixed with about its own weight of sand and alkali, and made into glass. The slag which results from the basic process contains a considerable quantity of phosphate of lime, and number of ingenious processes have been devised for recovering this in a comparatively pure state. At the North-Eastern Company's works, Middlesborough, they are making from 800 to 1000 tons per week of the slag, and have just erected a large mill for grinding this into powder. They have already shipped upwards of 60,000 tons of the raw slag to Germany.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another part of the Journal.]

Die Fortschritte in der Metallurgischen Probirkunst in den Jahren 1882 *bis* 1887. *Supplement zur II. Auflage der "Metallurgischen Probirkunst."* By Bruno Kerl, Professor an der Königlichen Bergakademie, Berlin. Published by Arthur Felix, Leipzig, Germany, 1887. Pages 98 and Index. Illustrated. Price, $2.

Mineral Resources of Michigan Report for 1886. By Charles D. Lawton, Commissioner of Mineral Statistics. Lawton, Mich. Published by the State of Michigan. Lansing, Mich. 1887. Pages 280 and Index. Illustrated.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

PATENTS GRANTED NOVEMBER 22D, 1887.

373,430. Composition of Matter for Tempering, Toughening and Improving the Qualities of Steel and other Metals. Lewis W. Bean, Philadelphia, Pa.
373,432. Expansion Joint. George H. Benjamin, New York, N. Y.
373,440. Apparatus for Sinking Wells. Matthew L. Chapman and Mark C. Chapman, Aurora, Ill.
373,452. Insulating Joint or Pipe-Coupling. Emil F. Gennert, Brooklyn, N. Y.
373,459. Shell for High Explosives. John A. Howell, Washington, D. C.
373,468. Process of and Apparatus for Producing and Consuming Gaseous Fuel. John W. Mitchell, Bayonne, N. Y.
373,478. Means for Relieving Discharge-Valves of Double-Acting Pumps. John H. Pendleton, Brooklyn, Assignor to himself, and Cornelius Tiers and Alexander H. Tiers, both of New York.
373,479. Means for Relieving Pump-Valves. John H. Pendleton, Brooklyn, Assignor to himself, and Cornelius Tiers and Alexander H. Tiers, both of New York.
373,500. Piston-Meter. W. Allen Sylvester, Chelsea, Mass.
373,502. Smoke-Consuming Furnace for Steam Generators. George R. Uridge, Detroit, Mich.
373,518. Wire-Stretcher. Barthel Erbe, Pittsburg, Pa.
373,522. Valve. Jason Giles, Indian Orchard, Mass.
373,523. Hydrant Gate Valve. Jason Giles, Indian Orchard, Mass.
373,532. Pressure-Gage. Albert C. Meady, Somerville, and Wilbur A. Dodge, Boston, Assignors to the Crosby Steam Gage and Valve Company, Boston, Mass.
373,542. Amalgamator and Separator. Chas. E. Tripler, New York, N. Y.
373,551. Mold for Casting Pipes. Johan A. Brinnell, Fagersta, by Vestanfors, Sweden.
373,557. Attachment for Boiler-Furnaces. William H. Harris and John C. Kafer, Washington, D. C.
373,584. Dynamo-Electric Machine. Thomas A. Edison, Llewellyn Park, N. J.
373,600. Concentrator. John W. Parmelee, Englewood, Ill.
373,609. Heater for Giant-Powder and other Explosives. Thomas Rundle and Alfred J. Rundle, Iron Mountain, Mich.
373,616. Steam and Gas Governor. Thomas Shaw, Philadelphia, Pa.
373,625. Smoke Consuming Furnace. George E. Wery, Paris, France.
373,672. Device for Clamping Plates or Sheets of Metal. Samuel McCarter, Norristown, Pa., Assignor to John D. Newbold, same place.
373,728. Roller-Reducing Mill. John P. Doelfel and Frederick Speiss, New York, N. Y.
373,739. Prevention of Sparking in Electric Motors and Generators. Daniel Higham, Philadelphia, Pa., Assignor to the Higham Electric Motor Company, same place.
373,741. Apparatus for Storing Liquid Ammonia. David U. Johnson, U. S. Army.
373,743. Means for and Method of Making Corrugated Headers for Water Tube Boilers. William Kent, Jersey City, N. J.
373,746. Method of Making a Smooth Surface on Stone, etc. James S. MacCoy, Brooklyn, N. Y.
373,766. Apparatus for Granulating Lead. Joal O. Bysworth, Denver, Colo.

THE METALLURGY OF STEEL.*

By Henry M. Howe.

(*Continued from page 379.*)

ATMOSPHERIC OXYGEN at a white heat burns iron vividly, with marked rise of temperature, especially if blown upon it. At a still higher temperature compact iron scintillates as it burns in air.

PURE WATER deprived of air appears to be absolutely inert even on finely divided iron at 21° C. (70° F.),[a] and on compact iron even at 100° C.[b] Steam converts iron superficially into magnetic oxide[c] even at about the melting point of lead, and at and above redness this action goes on rapidly.

COMMON PURE FRESH WATER, containing dissolved air, in very shallow open vessels attacks iron more rapidly at 100° C. than at a lower temperature according to Mallet: but, presumably in comparatively deep vessels to which air has less ready access, it corrodes fastest between 79° and 88° C. (175 and 190° F.),[b] probably because at higher temperatures the water contains comparatively little carbonic acid and free oxygen.

ORDINARY SEA WATER does not appear to corrode iron materially faster when hot or even boiling than when cold (Table 40),[d] perhaps because when hot it can dissolve but very little air. In many direct comparative tests hot sea water corrodes iron faster, in many others slower than cold sea water. In one set of exposures (Parker's) every one of the nine specimens which were immersed in boiling sea water in a boiler containing zinc, corroded much less rapidly than the exactly similar ones in cold pure sea water, and even much slower than those simply exposed to the weather. It is not clear how the zinc acted here: the usual conditions of galvanic action, actual contact or connection through some metallic conductor, were lacking, for the iron discs were completely insulated: there was no communication between iron and zinc save through the sea water itself, which indeed is a much better conductor than fresh water.[e] The corrosion of the zinc may have satisfied the more actively corroding components of the water, or the salts of zinc may have themselves retarded the corrosion of the iron.

If, as Mallet implies,[f] hot sea water attacks galvanized iron more energetically than cold, it is probably because it is the more destructive towards its zinc coating.

§ 163. INFLUENCES OF DIFFERENT MEDIA. A. IN GENERAL.—Neither pure oxygen nor water nor carbonic acid alone, nor oxygen with carbonic oxide appears able to start rusting at the ordinary temperature. But either oxygen and water or carbonic acid and water can start it. The action of deposited and indeed of liquid water in general is far more energetic than that of vapor of water, and the degree of concentration of the carbonic acid and oxygen influence the power of starting rust. Thus the diluted oxygen and carbonic acid of the atmosphere when in conjunction with liquid water are able to start rusting, but apparently not when simply acting with the undeposited aqueous vapor of the atmosphere; either pure oxygen or pure carbonic acid may produce slight rusting with aqueous vapor even when no water appears to be deposited; while with liquid water pure oxygen energetically attacks iron at the ordinary temperature. In ordinary cases rusting is probably induced by the joint action of the atmospheric oxygen and carbonic acid with deposited or ordinary liquid water. These two gases are usually present in both fresh and salt water: if they be absent iron immersed in water remains bright indefinitely.

Thus Percy found that bright iron gave no sign of rusting even after one or two years, when immersed in boiled distilled water in a sealed tube containing hydrogen, and that the fractures of iron in the often opened cases of the London museum of practical geology remained perfectly bright during twelve years, which he ascribes to the complete prevention of dew by the method employed for warming the museum.[g] Mallet too found that fresh water deprived of air did not corrode iron in a closed vessel, even at 100° C.[b]

Calvert, exposing clean iron blades for four months under different conditions obtained the following results:[h]

TABLE 45.—CALVERT'S EXPERIMENTS ON RUSTING.

In dry oxygen and ammonia	No oxidation.
" damp " "	"
" dry oxygen alone	"
" damp oxygen	In three experiments only one blade slightly oxidized.
" dry carbonic acid	No oxidation.
" damp carbonic acid	In 4 out of 6 cases a slight precipitate of iron carbonate formed.
" dry carbonic acid and oxygen	No oxidation.
" damp carbonic acid and oxygen	Oxidation most rapid a few hours sufficing: iron turned dark-green, then brown-ochre.

In a bottle containing distilled water and oxygen, the submerged portion of a clean iron blade rapidly rusted, the protruding part remained for weeks unoxidized: but when the oxygen was mixed with carbonic acid the protruding part as well rapidly "showed the result of chemical action."

The influence of air on rusting is further indicated by the facts, elsewhere alluded to, that hot sea water, in spite of being hot and in spite of its high electric conductivity, usually corrodes iron no faster than when cold, apparently because it has so little solvent power for air: and that Mallet's experiments convinced him (1) that fresh water corrodes iron most rapidly at from 175° to 190° F., which is approximately the temperature at which it releases its dissolved air most rapidly; (2) that the rate of corrosion in water is directly proportional to the volume of dissolved air for given temperature; and (3) that for given initial proportion of dissolved air, the rate of corrosion in still water is inversely as the depth of immersion within limits, as is naturally the proportion of air which diffuses downward to replace that consumed by the corrosion.[i]

Rust ordinarily contains but little carbonic acid, (Calvert found but ·9 and ·617% of iron carbonate in two specimens), whose role in the oxidation of iron is not clear. It may simply start the rust: or the iron may first form carbonate, which later turns to hydrated ferric oxide.

B. SUBAERIAL RUSTING, as we have seen, is probably not induced by the atmospheric oxygen and carbonic acid without the intervention of deposited water: but once started it appears to proceed without further deposition

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a Percy, Iron and Steel, p. 26.

b Mallet, Rept. Brit. Ass., 1840, p. 229.

c Idem, 1843, p. 12. It is not stated whether this occurs when the steam is wholly free from air.

d Mallet states, Idem, 1840, p. 226, that cast-iron corrodes more rapidly at 46° C. (115° F.) than at 8°@14° C. (46°@58° F.). I cannot reconcile this with his numerical results (Table 44). Eight out of 12 specimens of cast-iron, of which 11 apparently retained their skin, oxidized more rapidly in cold than hot sea water, the average loss being 30% greater in the former.

e The electric resistance of distilled water is about 2,300 times as great as that of a saturated solution of sodium chloride.

f Idem, 1843, p. 12.

g Percy, Iron and Steel, pp. 26, 27.

h Journ. Iron and St. Inst., 1871, I., p. 515, fr. Trans. Manchester Lit. and Phil. Soc.

i Mallet, Rept. Brit. Ass., 1840, pp. 228–9. It is not clear how far these conclusions are based on direct comparative tests, and how far on general observation and a priori reasoning.

of water, iron rust being so strongly electro-negative as to determine oxidation, and acid fumes, sulphuretted hydrogen, chlorine, etc., suffice to start it without deposition of water.

While subaerial rusting is probably very much slower than subaqueous in cold dry climates, yet as the amount of corrosion is probably nearly proportional to the time that the iron is actually wet by the weather, as dew, rain and snow appear to be very highly charged with oxygen and carbonic acid, and as the thinness of the film of water on objects exposed to the weather is so favorable to rapid rusting, (iron covered with a thin film of water or "wet and dry" rusts very much faster than when deeply immersed) it is hardly surprising that Table 44 contains many instances of corrosion by pure sea, and by both pure and foul fresh water, which are less than the corresponding weather corrosions. But as this wet and dry condition which favors the corrosion of iron so greatly is not especially injurious to coatings applied to protect it, so when zinced, painted or varnished, iron appears from Mallet's experiments (4 and 7, Table 44) to rust much less when exposed to the weather even in damp climates than when immersed in sea water, but yet usually more than in pure river water.

Iron ships are found to corrode more deeply along the water line than where constantly wet or constantly dry, illustrating the power of this wet and dry state to accelerate rusting.

C. Subaqueous Rusting.—The much smaller proportion of air and carbonic acid which sea water usually contains tends to render it less corrosive than common fresh water; but this is probably in most cases outweighed by influence of the higher electric conductivity and of the saline contents of sea water.[a]

The ratio of its corrosive action to that of fresh water on various kinds of wrought-iron, cast-iron and steel, according to Mallet's numerous direct determinations, while it occasionally rises to 20 : 1 and falls to 2·5 : 1, yet in general lies with rather surprising regularity between about 6 : 1 and 9 : 1.

D. Sewage, etc., according to Mallet's experiments, greatly increases the corrosive action of fresh water, and rather more for wrought than for cast-iron. It also increases that of sea water on irons other than skin-bearing cast-iron, but much less than in case of fresh-water. Owing to this foul fresh water corrodes unprotected wrought-iron and steel and galvanized wrought-iron faster, and both painted and planed cast-iron nearly as fast as pure sea water. So too while the presence of sewage invariably greatly hastens the corrosion of both cast and wrought-iron in fresh river water, yet it affects skin-bearing cast-iron much less than most other varieties, increasing its corrosion about threefold, while it raises that of painted and of planed cast-iron about six and sevenfold respectively, that of galvanized wrought-iron about eightfold, and that of unprotected wrought-iron and steel about eleven- and tenfold. Turning now to sea water, we find that in 13 out of Mallet's 22 pairs of immersions of skin-bearing cast-iron of which only 11 are given in Table 44, the presence of sewage retards corrosion, and on an average the foul sea water corrodes it less rapidly than the clear. Sewage however about doubles the corrosive action of sea water on painted and on planed cast-iron, on galvanized and on unprotected wrought-iron, and on unprotected steel, increasing the corrosion by from 43 to 158 per cent.

The preceding paragraph refers to Mallet's results, which are on the whole corroborated by those of Parker (23 to 33, Table 44) and C. O. Thompson. Parker's 11 wrought-irons and steels are invariably corroded faster by bilge than by pure sea water, on an average nearly thrice as fast. Thompson found that while the waste of gas works did not appear to increase the corrosive action of pond water initially somewhat polluted by stables, etc., sewage increased it 37% in case of wrought-iron and 76% in case of cast-iron. Here sewage hastens the corrosion of cast more than of wrought-iron, the reverse of Mallet's results.[b]

§ 164. Influence of the Composition of Iron.—The influence of other elements combined with iron on its oxidation at high temperatures will be considered later.

It is stated[c] that at ordinary temperatures combined carbon, and probably silicon and to a smaller extent phosphorus, retard the corrosion of iron. Manganese is said to increase the rusting tendency of malleable iron, but to diminish that of cast-iron. But it seems to me very doubtful whether such sweeping statements are justified by the present state of our knowledge.

To study the effect of combined carbon, I number the irons of each of several sets of experiments in order of their combined carbon, 1 having the most, and place them in Table 46 in order of the rapidity of corrosion, the fastest corroding standing first. Were it true that corrosion is inversely as the combined carbon, they should stand in inverted sequence, say 6, 5, 4, 3, 2, 1. To illustrate simultaneously the relative corrodibility of cast and malleable iron the former appears in heavy-faced type.

In not one of these 16 sets do the numbers happen to stand in inverted sequence, and this might easily happen if they were arranged at random. Indeed, comparing the sum of the first half of the digits of each case with that of the last half (*e. g.* in case number 1 comparing $3+4=7$ with $1+2=3$) we find that in eight out the sixteen cases of this table their first half is less than their last; and adding together all of these first halves we find that their gross sum is less than that of the last halves. To one rash enough to draw an inference from such conflicting data, this would mean that combined carbon hastened corrosion.[d]

(TO BE CONTINUED.)

NOTE.—The publishers of the ENGINEERING AND MINING JOURNAL will thank the readers of this article if they will promptly call attention to any inaccuracies they may observe in it.

[a] Mallet states, op. cit., 1840, pp. 233–4, that the relative corroding power of sea water is increased, in the case of wrought-iron, by the fact that the coating of rust which forms in it is comparatively pulverulent, while that which forms in fresh water adheres more tenaciously, acting as a cloak to binder further oxidation: and that while this is also true of cast-iron, it is to a much smaller degree, since the fresh water oxide coating adheres to it much less tenaciously than to wrought iron. On the other hand, according to the same writer, the relative corroding power of fresh as compared with sea water on galvanized iron is increased by the greater power of the former to perforate its zinc coating. Indeed, in one set of experiments he found that cast- and wrought-iron and steel, when in voltaic contact with zinc, were all corroded faster by fresh than by sea water, the former holding one volume of air and carbonic acid in eight, the latter one in seventy. (Op. cit., p. 255.) It will, however, be noted that this is not true of the zinced wrought-iron No. 7, Table 44.

In comparing the ratio of the corrosive action of sea water to that of fresh water, as given by Mallet in Table 44, we observe that it is 7·5 : 1 in case of galvanized wrought-iron, and in case of ungalvanized cast-iron wrought-iron and steel respectvely about 7·5 : 1, 8·9 : 1 and 8 : 1. In brief the difference between the rate of corrosion in fresh and in salt water is about the same for one class of iron as in another. It is true that in earlier and briefer exposures Mallet found that this ratio was about 4 : 1 to 6 : 1 for cast- and 8 : 1 for wrought-iron, *i. e.* that the sea water was especially severe on the latter metal. But these results refer to but a single pair of exposures of wrought-iron, while those in Table 44 lines 5 and 6 refer to 18 pairs of exposures, and carry weight proportionally.

[b] Trans. Am. Inst. Mining Engineers, IX., p. 268, 1881.

[c] Ledebur, Handbuch der Eisenhüttenkunde, p. 278.

[d] Reversing the order of Gruner's doubtful numbers, 2 and 3, would reverse the balance.

PERSONAL.

Professor Hitchcock, of Dartmouth College, Dartmouth, Mass., will spend the winter in Florida, studying fossil bird tracks.

Dr. Wimmer, the engineer of the Lee Basin and Denver City mining companies under the late management of Robert Bunsen, has been apppointed manager.

Mr. J. F. Bailey, of Philadelphia, has been appointed sole agent in the United States for the Landore Siemens Steel Company, Limited, of Landore, South Wales.

Mr. John Bogart, Secretary American Society of Civil Engineers, is at New Orleans, where he is engaged to survey Audubon Park, in that city, and make designs for its ornamentation.

E. E. Olcott, mining engineer, sailed on 24th inst. for the United States of Colombia on professional business. Among other things, he will examine the property of the Talento Gold Mining Company.

Mr. Chorles Dobler, for some time assayer of the Mount Cory Company, Nevada, has gone to Zacatecas, Mexico, to take charge of a 20-stamp mill recently erected by the La Noria Mining Company.

"Dan de Quille," who for many years has held the position of mining editor of the Virginia City (Nev.) *Enterprise*, has resigned from that paper, and Mr. Alfred Chartz, formerly connected with the Virginia City *Report*, has been appointed his successor.

Mr. Chas. Butters, mining engineer, has completed his contracts with the San Sebastian Gold Mining Company, San Salvador, Central America. His temporary address will be Berkeley, Alameda County, California, until January 1st, after which he can be found at his laboratory, 151 Cedar street, New York.

Prof. S. P. Langley, renowned in the field of science as Superintendent of the Allegheny Observatory, has been promoted from the office of Assistant Secretary of the Smithsonian Institution, Washington, D. C., to that of Secretary, made vacant by the death of Prof. S. F. Baird.

FURNACE, MILL, AND FACTORY.

The Anson G. Wood Mower and Reaper Works, of Youngstown, Ohio, will remove its plant to Chattanooga, Tenn.

The Newark Wire Cloth Works, at Cleveland, Ohio, were destroyed by fire on the 21st inst. The works had been in operation only about six months.

It is the intention of the Iron City Company, Iron City, Tenn., to erect furnaces for the manufacture of charcoal iron; also charcoal chemical works.

The Charles River Iron-Works, Edward Kendall & Son, proprietors, located at Cambridgeport, near the West Boston Bridge, Mass., were partly destroyed by fire, on the 20th inst.

It is reported that Mr. Jacob Reese, of Pittsburg, Pa., has interested some New York parties in his patent, who are about to organize a company to make basic phosphate of lime.

The Montana Rackarock Powder Company has been organized to handle the explosive, Rackarock, throughout the Pacific slope. Mr. Milo French, at Butte, Mont., is the manager.

It is expected to have one of the furnaces at the works of the Sloss Iron and Steel Company, now being erected by Messrs. Gordon, Strobel & Laureau, at North Birmingham, Ala., running by April 1.

The Standard Machine-Works, of Bay City, Mich., have located a new manufactory in Chattanooga, Tenn., and when the work on the buildings is completed the plant will be removed to Chattanooga.

The North Chicago Rolling-Mills Company, Chicago, Ill., will close down for a short time toward the end of the year to clean up and make the necessary repairs. The works will be in full operation again by the beginning of February.

The Anniston Gas Company, which has been organized at Anniston, Ala., with a capital of $25,000, has purchased the right for Calhoun County, Ala., to use the Sloper automatic water gas process and expect to introduce this gas in Anniston at once.

A mechanic's lien for $91,000, entered by James P. Witherow, of Pittsburgh, has been placed on record in Bedford County, Pa., against Robert Hare Powel's Sons & Co. This represents Mr. Witherow's claim against the Powels for the new furnace at Saxton.

The Scottdale Sheet Iron-Works, at Scottdale, Pa., formerly owned by W. H. Everson & Co., will start up again on the 28th inst. This plant has been idle for five months. The arrears have been paid to all workmen who had undisputed claims against the late firm.

An addition to the National Iron-Works, at Duluth, Minn., is to be made at once, and a blast-furnace of sufficient size to supply the works with pig-iron will be put in. The works will be removed from the present location to a point nearer the new ship yard, which will have its iron manufactured by the National Company.

A gigantic dynamo for the works of the Cowles Electric Smelting and Aluminium Company, at Stoke-on-Trent, England, is now in course of erection. The machine has been built by Messrs. R. E. Crompton & Co., of the Arc Works, Chelmsford, and will have a minimum capacity of 300,000 watts, requiring 500 horse-power to drive it.

At the Union Iron and Forge Mill of Carnegie, Phipps & Co., Pittsburgh, Pa, improvements are projected which virtually mean an entire remodeling of the plant. The blacksmith shop is to be moved to the river bank to make room for fifty additional puddling furnaces. The old furnaces are being torn down, only to be rebuilt in such manner as to economize space, and to give more room for the new ones to be erected, and for the erection of more in the future, should it be necessary; and a large train of rolls for rolling structural iron of all kinds will be erected.

The firm of James Jenks & Co., Detroit, Mich., made an assignment on the 21st inst. They have been engaged in the manufacture of patent injectors, and other specialties of brass and iron, and the sale of machinery. The firm and its immediate predecessors in the Jenks family have been engaged in handling machinery in this city for 30 years. J. S. Fay & Co., of Cincinnati, are reported to be the principal creditors. The liabilities are stated at $35,000 to $40,000, which the company declare will be fully met by the assets, if the latter bring any thing like their value.

The preparations for making steel guns at the government gun plant at the Watervliet Arsenal, Troy, N. Y., are practically completed, and work has already begun on the smaller caliber cannon that are to be issued to the United State batteries for service. The castings were made at Midvale, near Philadelphia. The steel fieldpieces complete, without carriages, cost about $525 each. The large steel guns have heretofore cost about $1000 a ton. The material for completing the 27 guns is all on the ground, and Watervliet is the only place where steel guns are being made for the United States Army.

The Dickson Manufacturing Company, of Scranton, Pa., has just completed the largest boiler, it is said, ever constructed in America. It is to be used at the Calumet & Hecla copper mines of Michigan. The boiler is the tenth one purchased by the company during the present year. It is 35 feet 4 inches in length, 10 feet 6 inches wide and 11 feet six inches high. It would require one man 2200 days to build the boiler. It weighs 45 tons, and is of 1000 horse-power. The boiler is made of steel from the Otis Steel Works, at Cleveland. One sheet used weighed two tons. The steel from the crown sheet to the wagon top is $1\frac{3}{8}$ inches in diameter, that near the valve is $\frac{3}{4}$ inch, and all other parts $\frac{9}{16}$ inch in diameter. There are 198 3-inch tubes in the boiler, a double fire-box connecting with the flues, and stay bolts and rivets are used, varying in length from 6 to 16 inches. There are 30 hand holes for the purpose of cleaning the boiler, which may serve to illustrate its immense size.

CONTRACTING NOTES.

Contracts open will be found on pages xiii and xix New contracts this week: No. 641, Iron Bridge Construction; No. 642, Special Iron Casting, Hydrants, Valve-Casings for Water-Works; No. 643, Cast-Iron Water Pipe; No. 644, Iron Superstructure for Bridge; No. 645, Sewers; No. 646, Boilers, Duplex Pump and Water Tower; No. 647, Dredging; No. 648, Dredging; No. 649, Water-Pipe; No. 650, Masonry Dam; No. 651, Iron Bridge; No. 652, Steel Ranges and Stoves; No. 653, Brass and Copper Instruments; No. 654, Water Works; No. 655, Water Works Supplies.

Mr. J. J. M. Smith, Marble Falls, Texas, who has made a contract, is desirous of entering into correspondence with manufacturers of water-works supplies.

The contract for furnishing 12,000 lineal feet of 36-inch water-pipe for the water-works, Minneapolis, Minn., was awarded to Dennis Long & Co., of Louisville, Ky.

A contract for two pumping engines of 15,000,000 gallons capacity each for the water-works at Minneapolis, Minn., was let to Henry B. Worthington, of New York. They will cost $129,000, and are the largest pair west of Philadelphia.

A large land improvement company, of California, has contracted the Pittsburg Tube Works, Pittsburg, Pa., for an unusually large quantity of wrought-iron pipe, to be used for irrigating purposes in the neighborhood of Los Angeles. The pipe is to be two inches in diameter, and after being put together will reach a distance of 68 miles.

The Philadelphia & Reading Railroad Company has contracted with the Baldwin Locomotive Works, Philadelphia, Pa., for twenty-five new freight and coal locomotives, to be delivered about January 1st. They are intended for the increased business of the main line. The machine shops of the company in Philadelphia are so crowded with repair work that no new locomotives can be built in them at present.

LABOR AND WAGES.

A State committee of the workingmen of Virginia will meet in Staunton on the 26th of January next to take steps to establish a State Bureau of Labor Statistics and to abolish the convict contract plan.

The Troy Steel and Iron Company, at Troy, N. Y., has given notice that on and after December 1st common labor will be reduced to $1.25, and that there will be a general revision of the wages of other employés.

A member of the Demand Committee intrusted with the duty of reporting on the exact status of the miners' strike in the Lehigh region and Panther Creek Valley, Pa., has completed his labors, and states that the miners are more determined than when the strike was inaugurated, and learned that increased contributions have removed every sign of discontent. Officials of the national labor organizations are in this section and promise sufficient aid to extend the struggle through next year if necessary. The Knights everywhere believe in ultimate success.

A circular is now being prepared by the Secretary of the Federation of Miners and Mine Laborers, and will be issued to the 250,000 miners, organized and unorganized, of the country in a short time. It is in the interest of harmony and unity of action, and is one result of the joint meeting of the Executive Board of the Miners' Federation and National District Assembly 135, Knights of Labor, which closed in Columbus, Ohio, on the 17th inst., and to which we referred in our last issue. This circular will provide no strike shall be ordered in the future without the consent of both organizations. In case of a strike, the organization having the majority in the district where it occurs shall levy upon both organizations. The two boards will meet in Pittsburg in February to consider the reply of the miners. Immediately following this meeting a general delegate convention of all the miners in the country will be held in Pittsburg. At this meeting delegates will be elected to the Inter-State Convention of miners and operaters to arrange a scale of wages to be paid in the various districts throughout the country, to go into effect May 1st, 1888. The Inter-State meeting of operators and miners will be held probably in April, but the date has not yet been fixed.

The steel workers' new scale for 1888, which is to go into effect on the 1st of January, is about ready to be taken to the manufacturers to be signed. The new scale has fixed prices for wages by the ton and day, and has been so arranged that every workman in a steel mill, outside of common labor, has been provided for. There has nearly always been a special scale for steel workers, but it only embraced little more than half the skilled work in a steel mill. In the scale for 1888 an increase amounting to about 10 per cent all around will be asked for, except on a few points in which it will be considerably more. The new scale calls for work to be paid for by the hour or day, which is a movement toward doing away with the contract system more than the one-job system. The first step to thoroughly revise the steel workers' scale was taken at the time of the trouble at the Mingo Junction Steel Mill. The Amalgamated Association also has formed new sub-lodges in steel mills where heretofore there have been none, and where they have existed and were partially or altogether dissolved, they have been reorganized, but everywhere the members have been all notified that those who are Knights of Labor must abandon that order by the 1st of April next year, and in the meantime become members of the Amalgamated Association.

GENERAL MINING NEWS.

Work has been commenced on the Knoxville Southern Railroad, which is to run from Knoxville, Tenn., to Atlanta, Ga. The new line will be an extension of the Marietta & North Georgia Railroad, and will have access, both in Eastern Tennessee and Northern Georgia, to an extensive region rich in undeveloped minerals.

WISCONSIN CENTRAL RAILROAD COMPANY.—This company has about perfected an arrangement for shipping ores east and south by rail. After the ore is frozen at the mines it can be broken up and handled about the same as big blocks of stone. No shipments will be made until the ore is frozen, however, as, should it freeze en route, the destruction of the car might be necessary to get it out. At Chicago, the ore will be loaded into Baltimore & Ohio coal cars, which would otherwise return empty. A low rate can therefore be profitably made.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including November 16th, as reported by the Marquette *Mining Journal*, were as follows:

	Tons. 1887.	Tons. 1886.
Marquette, Marquette District	795,794	833,044
St. Ignace, " "	90,188	71,020
Escanaba, " "	850,829	687,731
" Menominee District	1,116,832	844,663
Ashland, Gogebic District	1,040,727	703,947
Two Harbors, Minnesota Iron Company, Vermillion District	388,799	.....
Total tons	4,283,169	3,140,405

SHIPMENTS OF IRON ORE, GOGEBIC DISTRICT.—Shipments of iron ore from Ashland, Wis., the mines of the Gogebic District, for the season, up to and including November 16th, are as follows:

	Tons.		Tons.
Anvil	6,676	Kakagon	43,034
Ashland	146,287	Montreal	24,378
Atlantic	1,319	Nimikon	23,217
Aurora	110,300	Norrie	155,426
Bessemer	15,647	East Norrie	15,791
Blue Jacket	1,340	Odanah	21,553
Bonnie	1,004	Pabst	9,017
Brotherton	21,721	Palms	1,414
Colby North	68,526	Puritan	26,566
Colby South	155,477	Sunday Lake	14,533
Colby, Sec. 15	12,996	Superior	21,990
First National	984	Vaughn	2,101
Germania	43,509	Trimble	12,764
Iron Chief	2,249	Parker	9,145
Iron King	47,001		
Ironton	24,762	Total tons	1,040,727

The shipment shows an increase of 336,780 tons this

year, as compared with the shipments made at the same time last year.

ALABAMA.

CALHOUN COUNTY.

ANNISTON ORNAMENTAL SLATE AND ROOFING COMPANY.—This company has been organized at Anniston, with a capital stock of $50,000, for the purpose of developing a slate quarry near Anniston, and to manufacture every species of ornamental and roofing slate. A shaft 42 feet deep has been sunk on the property.

JEFFERSON COUNTY.

BIRMINGHAM MINING AND MANUFACTURING COMPANY.—This company, which owns considerable mineral property near Birmingham, has only opened up two quarries. At each is a Gates crusher, No. 7, guaranteed to crush 3200 tons of rock per day of ten hours, which is twice the amount of rock that will be needed when all the new furnaces go into blast, and the old ones running to full capacity. To run the crushers there are two 100 horse-power engines. Ten large Sargent drills, run by compressed air, will be used to mine the rock, having twice the capacity necessary. The capacity of the plant being twice the amount required when they get fully open, will guarantee the furnaces a reliable source of supply at all seasons. Two lime kilns have been built, with a capacity of 200 tons per day, and seven more are in the process of construction. The lime will be of the same quality as the Calera lime. This company also owns the extensive lime rock quarry at Blount Springs.

HENRYELLEN COAL COMPANY.—This company, which owns 25,000 acres of coal lands located in the Cahaba coal-fields, is now working two openings with an output of 800 tons per day, and is at present opening a new eleven foot deep slope that will, at least, double the present output. These mines are situated twelve miles from Birmingham, on the Georgia Pacific. The Georgia Central, now nearing completion, will run directly through this property, and by the mines now being worked, thus affording facilities for handling the coal another season. At present the output simply depends upon the capacity of the railroad facilities for handling the coal after it has been mined.

LAUERDALE COUNTY.

WATERLOO LAND, MINING AND MANUFACTURING COMPANY. — This company has been organized at Waterloo with the following officers: George T. McWhorter as President; Hiram Richardson, Vice-President; O. P. Tucker, Treasurer, and J. M. Allen, Secretary.

ARIZONA.

ETTA MILLING AND MINING COMPANY.—This company has been organized at St. Louis by Josephy Dickson, D. P. Slattery, Wells H. Blodgett, Alphonso C. Stewart, John N. Phillips, Levi A. Loyd and Samuel A. Fordyce, all of St. Louis, with a capital stock of $1,000,000, to work the Etta mine. The company has purchased a twenty-stamp mill near the property. Active developments will at once begin.

ARKANSAS.

MONTGOMERY COUNTY.

PHŒNIX GOLD AND SILVER MINING COMPANY.—A correspondent writes us that this company has settled all its suits, and is now pushing work in its mines, and will soon have its new Bartlett smelter in operation.

CALIFORNIA.

NEVADA COUNTY.

BRUNSWICK GOLD MINING COMPANY.—The shaft has now attained a depth of 200 feet, the ground being "speedy," as the miners say, and every thing around the works is in harmony with good prospects. As far as depth has been obtained the ledge shows well, so much so that the management deems it prudent to prepare the mill for crushing quartz. It will take a month or so to remodel the mill at the Brunswick to shape it for water-power, but in view of the fact that stoping will commence within two or three weeks, the mill will run by steam, and will be ready for crushing about January 1st. Ore can be taken from the mine sufficient to supply a larger mill than is at present on the premises, and no doubt, from present indications, the mine will demand an addition of stamps.

PLACER COUNTY.

JULIAN MILL AND MINING COMPANY.—This company has been organized with a capital stock of $1,000,000 to develop the Julian quartz vein, near New Castle. The directors are: J. C. Stump, A. H. Schnabel, W. H. Sears, Henry Deas and George J. Henry.

SHASTA COUNTY.

REDDING & SACRAMENTO RIVER PLACER MINING COMPANY.—This company has been organized with a capital stock of $1,000,000. The trustees are F. H. Daykin, Edward Frisbie, F. P. Primm, W. L. Brown, L. S Barnes, H R. Wiley, R. G. Dunn, R. M. Saeltzer, James M. Gleaves, J. H. Miller and James McCormick. The object of the company is to locate, buy, and sell mining claims in the Sacramento River, commencing at the proposed dam of the Shasta Water Company, opposite Middle Creek, and extending south three miles. The fact that the Shasta Water Company will divert from the river 100,000 miners' inches of water for manufacturing and irrigation purposes will lessen the labors of the incorporation in turning the remainder from the sections of the stream as required for working.

CANADA.

PROVINCE OF QUEBEC.

New acid works are in course of construction by G. H. Nichols & Co., at the copper and nickel mines at Orford, and are nearly completed. The manufacture of sulphuric acid is expected to commence within a short time

ORFORD. — According to the Sherbrooke *Examiner*, the owners are putting new machinery in this mine, which, until recently, was owned by the Orford Copper and Sulphur Company. It is now in a prosperous condition and continues to yield large quantities of ore. From 1500 to 1600 tons are shipped monthly to New York, and there are reasons to believe that the output will increase in the near future.

COLORADO.

COLORADO COAL AND IRON COMPANY.—A decision was rendered in the Supreme Court, at Washington, D. C., on the 21st inst., in the case of the Colorado Coal and Iron Company and others against the United States. The object of this suit was to have cancelled sixty-one patents for tracts of land in Las Animas County, Colorado, amounting in the aggregate to 9566 acres. In the case of each of these patents there appeared to be filed all the necessary affidavits, showing that the pre-emptors had entered upon the land, and had made improvements thereon. The price paid to the government for these lands was in the aggregate $12,000. Between 1873 and 1880 these lands were conveyed by the alleged patentees through one William S. Jackson to the Southern Colorado Coal and Town Company, and on February 1st, 1880, the latter company consolidated with the Colorado Coal and Iron Company, which mortgaged the property and issued bonds thereon to the amount of $3,500,000.

It is charged by the government that this whole series of transactions was a gigantic conspiracy and fraud to obtain valuable mineral lands almost for nothing. The Coal and Iron Company maintains that it was an innocent purchase for value, without notice of the alleged conspiracy. The Circuit Court held that the charge in the bill that the supposed pre-emptors and patentees were fictitious persons, having no existence, was sufficiently proven; that consequently, there being no real grantees, no legal title passed from the United States, and that as the defendants acquired no legal title by virtue of the supposed conveyance to them, they can not claim protection as bona fide purchasers for value without notice of the fraud.

This court holds that the government has not conclusively shown that all the alleged pre-emptors of the lands were fictitious persons, and that there were, therefore, no real grantees, nor are the facts sufficient to overcome the presumption of innocence on the part of the grantees or the Register and Receiver of the Land Office; nor does the evidence prove that the time Jackson acquired the title to the lands which he afterward transferred to the Coal and Iron Company there were upon any part of the premises in controversy, any "known mines" of coal, within the meaning of the statute. For these reasons the decree of the Circuit Court in favor of the United States is reversed and the case remanded with directions to dismiss the bill.

ARAPAHOE COUNTY.

PIONEER NATURAL GAS AND PETROLEUM COMPANY. —This company has been organized at Denver, with a capital stock of $250,000, for the purpose of boring for natural gas near Denver. Machinery is now being purchased to sink a well 4000 feet if necessary. The company have leased between 3000 and 4000 acres of land in the direction of Morrison, and as soon as the machinery arrives and if set up the work will commence and be prosecuted vigorously. The officers are: S. C. Webber, President; E. C. Beardsley, Vice-President; A. N. Hutchings, Secretary, and S. W. French, Treasurer.

CLEAR CREEK COUNTY.

FREELAND MINING COMPANY.—The production for October amounted to $8350.55 gold, $1230.67 silver; total, $9581.22.

PLUTUS MINING AND SMELTING COMPANY.—During October the output was: Gold, $5613.69; silver, $4687.89; copper, $237.07; total, $10,538.64.

EAGLE COUNTY.

IRON MASK.—Shipments from the mine have been delayed for some time while the tramway was being overhauled. Superintendent Helm is authority for the statement that the ore in sight is estimated

FREMONT COUNTY.

FLORENCE OIL COMPANY.—The derrick which was recently destroyed by fire at one of the wells of the company at Florence has been replaced and the well cleaned out and cased to the bottom, a depth of 1910 feet, with 4½-inch pipe. A pocket was drilled below the oil strata and tubed to the surface. Pumping has begun and on the first day 168 barrels of oil of 42 gallons each were produced, or at the rate of 350 barrels per day.

LAKE COUNTY.

The Leadville *Herald-Democrat* reports the following: On the 20th inst, there was but one idle stack in the camp, with, of course, the exception of the La Plata's, and that one, at the Manville, is being heated, preparatory to blowing in at any moment. The cause of this is due to some extent to the influx of Aspen ore, but not entirely, as the amount is comparatively small, and goes almost exclusively to the Arkansas Valley. The Leadville mines are producing, in all probability, something in the neighborhood of 1500 tons per day, including iron, at present.

MATCHLESS.—The Bohn shaft has struck the contact at a depth of 260 feet, and cut into the iron ore, which is of good grade, assaying 35 per cent excess in iron and 10 ounces in silver.

PITKIN COUNTY.

Mr. Charles Ruter has bought of R. C. Wilson & Co. the building and mill-site, now occupied by Matthews & Webb, as a sampler, Aspen. It is understood that Mr. Ruter bought it for the Pueblo Public Sampling-Works.

ASPEN.—There has been considerable litigation about this property, and application was made to have a receiver appointed. This motion arose from the complaint that Messrs. Brown and Butler, the men who were working in the mine by permission of Judge Hallet, had mined, shipped or hidden away ore to the value of $198,000, none of which had been reported to the court. Joseph N. Marshall, the gentleman from whom the Marshall coal mines received their name, has been appointed receiver of this mine by Judge Hallett. The receiver's duties will be to hold possession of the mine and to take care of the ore already mined, but he is not to work the mine except as the court directs. If either of the parties to the suit think that development work is necessary, Judge Hallett will, on proper application, order such work done.

PUEBLO COUNTY.

PUEBLO SMELTING AND REFINING COMPANY.—This company is now building an extensive copper plant at Pueblo. The buildings will be located on the mesa above the silver and lead works, and the main building, which will be of brick, will be 600×120 feet. The character of the works to be established is unknown, as it is said to be a secret process that will be used. The company has been experimenting for a year or so on copper. There are many low-grade copper mines in this vicinity, the owners of which have heretofore been unable to ship the product of their mines at a profit, owing to the cost of transportation. Several of these low-grade copper mines are located in the Green Horn range of mountains, just twenty-eight miles east of Pueblo. They are well developed and have thousands of tons of ore on the dump. Sixty miles south is the Copper Bull, that was bonded several years ago for $1,000,000 by a London, England, syndicate, and then dropped because there was no reduction works at Pueblo to treat the ore.

SAN MIGUEL COUNTY.

MARSHALL BASIN GOLD MINING COMPANY.—This company has been organized with a capital stock of $1,000,000; par value of shares, $5 each; unassessable, to work the Mt. Sneffles and Shamrock gold mines, situated in Marshall Basin. The Mt. Sneffles mine has been reported upon by John W. Plummer, Mining Engineer, who says: "The vein is a strong, true fissure, traceable for over a mile. Its width on the Sneffles claim is 5 feet between the walls. Its course is east and west. The country-rock is trachyte. On the north side there is a band of metamorphosed country-rock about 12 inches wide, carrying a quantity of iron pyrites. The central portion is formed of crystallized quartz, or quartz and porphyry intimately mixed. This latter may be called the pay-streak, measuring 12 to 16 inches wide, and which shows pure gold, quite visible to the naked eye. The croppings stand out prominently for a length of fully 1000 feet. The development consists of an open cut fully 15 feet long, and a tunnel from the end of the open cut about 25 feet long. This tunnel, although driven for such a short distance, shows the structure of the vein to great advantage." The officers of the company are William Hickok, New York, President; Wm. L. Church, New York, Secretary; Wm. E. Wheeler, Financial Agent at the mines.

DAKOTA.

CUSTER COUNTY.

The Holliday tin location, located at Warren's Gulch, one fourth of a mile east of the Tin Mountain Company's property, has been bonded, through Mr. A. L. Sivyer, to Chicago parties for $5000, the bond to run until March 15th, 1888. The location was almost wholly undeveloped, the required amount of assessment work for the present year being all the work done upon it.

PENNINGTON COUNTY.

HARNEY PEAK TIN MINING COMPANY.—This company has secured a bond, running until the 1st of May, in what is known as the Daisy group of tin mines, situated about four miles northwest of Custer. The consideration was $14,000 for the group, only one claim of which (the Daisy) having been developed to any considerable extent.

MEXICO.

Messrs. José Tellez & Company have obtained permission to survey a mining region of six hundred square kilometers in the municipality of Pueblo Nuevo, District and State of Durango. Among the concessions granted to Messrs. Tellez & Company are the possession of thirty claims in the veins which they may discover within the region surveyed, as well as of the superficial extent of ground necessary to work the said veins and a tract of 6,250 acres on which to establish requisite buildings. If such land is at present national property it will be made over to the concessionaires on the payment of its value according to tariff rates, and if it be private property they are authorized to demand its expropriation on the ground of public utility. They are also empowered to raise dams in rivers, and to construct aqueducts or tunnels, in order to procure water-power for smelting purposes, etc. But this permission only refers to the area which Messrs. Tellez are authorized to survey, and does not affect the rights of third parties. The other concessions and immunities, such as exemption from taxation for the shares and working capital, are similar to those granted to other com-

panies with which the executive has made contracts in virtue of the law of June 6th last. The principal obligations of Messrs. Tellez & Company are: To commence a thorough survey of the region within three months from the date of the contract and to complete said survey within six months; to organize, within eighteen months, either here or abroad, a company with a nominal capital of at least $250,000, which, within five years from the time when it takes legal possession of the property, shall invest at least $225,000 in working the veins; to keep at least thirty-two hands at work on the original claims, and to employ one additional hand for every new claim incorporated; and, finally, to deposit $3000 in public bonds in the National Bank as a guarantee of the fulfillment of their part of the contract. This concession, which Messrs. Tellez are also authorized to sell or otherwise dispose of, is to remain in force ten years.

A concession exactly similar in all its leading features has been granted to Mr. Manuel Iglesias touching a mining district in the same region.

THE SMELTING COMPANY OF MEXICO, LIMITED.—This company, to the organization of which we referred in our issue of June 4th, has taken hold of the San Felipe reduction-works, and will give its attention to the purchase of dry silver and silver lead ores. Especial attention has been given to the sampling arrangements and assay departments; all ores will be sampled and assayed without delay and cash paid therefor. The difficulties regarding a steady supply of flux have been overcome, and as the fuel used will be only a trifle above the cost of the same fuel used at El Paso, there seems to be an excellent prospect for this company. The desirability of a home market for ores is apparent, and miners shipping from points along the Central Railway will doubtless give the San Felipe a thorough test. Mr. C. S. Nicol is the manager at Chihuahua, and Mr. Edgar P. Rathbone, of England, represents the company in this republic.

MICHIGAN.

COPPER MINES.

CALUMET & HECLA MINING COMPANY.—A fire was discovered in the seventeenth level of the Calumet & Hecla mine in No. 1 shaft, on the 20th inst. Every shaft in the mine was closed except the Black Hill's portion, which is really a separate mine and unconnected with the main working. Less than four months ago a serious fire broke out on the sixteenth level in No. 2 shaft, and burned for twenty days. The damage to the mine then has not yet been fully repaired, and the flames can now feed on the half-charred timbers. Carbonic acid gas is being pumped into the mine. Every thing points to the fire being of incendiary origin. This is the second bad fire in four months and the third within three years. Reports of the 23d inst. state that the fire is spreading in the seventeenth, sixteenth, and fifteenth levels from No. 1 to No. 2 shafts. In the latter is the Hecla mine engine.

IRON MINES.

George M. Wakefield, of Milwaukee, has commenced suit against the Sunday Lake and Iron Chief mining companies, in the Gogebic District, to obtain possession of these mines. Mr. Wakefield claims that the time for paying the royalty is long past due, and that he is entitled to the mines on that account. It is said other similar suits are pending.

MINNESOTA.

CONSOLIDATED VERMILLION COMPANY.—In our issue of October 29th, we stated that this company had sold an interest in some of its iron lands to English capitalists for $3,000,000. A correspondent advises us that $300,000 was the amount paid for a half interest.

ST. LOUIS COUNTY.

MINNESOTA IRON COMPANY.—It is thought that the total shipments of the season will amount to 390,000 tons. The company shipped this year three classes of ore. The first was Bessemer containing, it is stated, 66⅜ per cent of pure iron, and less than ·06 of phosphorus; the second is called Minnesota, containing 66⅜ per cent of pure iron, without reference to the amount of phosphorus, and the third, Red Lake, containing 62 per cent of pure iron. Shipments of Bessemer were 230,000 tons; Minnesota, 100,000, and Red Lake, 60,000. The company will work 1,200 men during the winter, and in the spring will have 200,000 tons in stock piles. Shipments for the next season are estimated at 600,000 tons. Including this year's shipments the total output of these mines has been 982,000 tons.

MISSOURI.

HENRY COUNTY.

A company recently formed to prospect for coal near Urich struck coal at a depth of 35 feet. The coal proved to be a good quality of cannel coal, and seven car-loads put on the market in Kansas City brought 24c. a bushel. Several hundred acres of land have been leased for carrying on further operations.

MONTANA.

JEFFERSON COUNTY.

ELKHORN MINING COMPANY.—The lode conflict case of A. F. Bright *et al. vs.* the Elkhorn Mining Company has been decided by the Commissioner of the General Land Office in favor of the defendants. This is the case of the alleged slight conflict of the Sophia and A. M. Holter, the latter being that from which the Elkhorn Company is now taking its ore.

JAY GOULD MINING COMPANY.—The production for October amounted to $40,400

LEWIS & CLARKE COUNTY.

MONTANA COMPANY, LIMITED.—The production for October amounted to $178,300, and the working expenses for the month to $56,000. The railroad has been completed to Marysville, and is now open for traffic. This places the company in direct communication by rail with the coal fields, and large tracts of land from which supplies of cord wood can be obtained whenever necessary.,

SILVER BOW COUNTY.

ALICE GOLD AND SILVER MINING COMPANY.—According to reports, the company will commence work on the North and Salisbury mines recently leased, and start up twenty stamps of the Alice mill on ore from these mines. It is also stated that extensive preparations are being made at the mines and mills, and that the work will be resumed shortly on an extensive scale.

BELL.—This copper mine has been purchased by the Chambers syndicate for $75,000.

BLACK PINE MINING COMPANY.—The stockholders held a meeting last week to raise $40,000 necessary to pay the indebtedness and provide a fund to go ahead with the work, and $20,000 was subscribed. The outlook is considered hopeful. We referred to the difficulties of this company in our issue of October 15th.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The company has shipped since the consolidation about 500 tons of matte, producing from 60 to 65 per cent of ingot copper. The mines are now shipping about nine tons of ingot per day, and expect to double this by December 1st, when a new furnace will be put in operation. The developments at the mines continue highly encouraging, and a number of plans for future extensions are in contemplation.

NEVADA.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle:*

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—Official reports show that during the week ended the 12th inst, 1079 tons of ore were shipped to the Morgan mill and 1057 tons to the Eureka mill, and 000 tons to the California mill. The average assay value of all the ore worked at the above mills during the week, according to battery samples, was $31.13.

CROWN POINT MINING COMPANY.—Daily shipments of 30 tons of ore are made to the Vivian, extracted in explorations on the 400 level. The 500 level will be opened up to a point where it should cut the 400 ore development downward continuation by December 1st.

HALE & NORCROSS MINING COMPANY.—Ore is being extracted from the 700 level old stopes. Fair grade ore is showing in the 1350 level south drift from the winze bottom, sunk below the 1300 level east cross-cut. The 700 level south line cross-cut is in a vein formation carrying streaks of low-grade quartz.

MONTEZUMA CONSOLIDATED MINING COMPANY.—This company has been reincorporated in San Francisco with the following officers: Jabez Howes, President; Nat. T. Messer, Vice-President; John Crockett, Secretary, and Samuel T. Curtis, Superintendent. The trustees have set aside 10,000 shares of the capital stock, the sum realized from its sale to be used for developing the mine. The Montezuma was among the earliest mining locations in Storey County. The ground lies east of the East Consolidated California & Virginia and west of the Brunswick lode. Many thousand dollars were expended in 1863 in driving a tunnel on the property, in which a broad belt of what was then termed low-grade ore was developed. The Montezuma at that date was considered one of the most important mining locations east of the main Comstock lode. The old tunnel was reopened for some distance in the early part of the current year.

POTOSI MINING COMPANY.—Ore extraction is in progress from the stopes opened in the 250 level development which is dumped in the mill chutes. The mill will start crushing.

SAVAGE MINING COMPANY.—A total of 420 tons of ore was extracted from the 600, 700, and 750-level stopes. Battery pulp assays of ore crushed the current week range from $25 to $34 per ton, the latter figure representing returns from the last shipment. An uprise is being made above the 800 level to cut the downward continuation of the high-grade ore developed in the 750-level north drift.

OHIO.

PERRY COUNTY.

SUNDAY CREEK COAL COMPANY.—This company has purchased of George I. Seney and other New York parties 14,000 acres of coal lands in Perry County; the consideration is said to be $2,500,000. They will take possession and operate the property after December 1st.

PENNSYLVANIA.

The Lehigh Valley Railroad Company has secured the right of way for a branch of the Welshtown Valley from Slatington through much valuable slate land, which is being rapidly developed. This branch will enable the operators to compete with those along Trout Creek.

JOHNSONBURG RAILROAD COMPANY.—A charter has been issued to this company to build a line connecting with the Buffalo, Rochester & Pittsburg Railroad at Johnsonburg, Elk County, and running to Howard Crossing, McKean County. The capital is $420,000, and the road will run through the oil regions.

PHILADELPHIA & READING RAILROAD COMPANY.—The court has issued the necessary order in the cases pending against this company, and passed its properties into the hands of the reconstruction trustees. All injunctions and restraining orders against the road were dissolved.

STATE LINE & MIDDLESEX RAILROAD COMPANY.—A charter has been granted to this company to build a road from Hickory Township, Mercer County, at the State line, between Pennsylvania and Ohio, through Wheatland to Middlesex, a distance of five miles. The road is intended to increase the facilities for the transportation of ore to furnaces. The capital is $40,000.

COAL.

Messrs. Coxe Brothers & Co.'s No. 2 breaker at Drifton was burned to the ground on the morning of the 19th inst. The fire it is generally believed was the work of an incendiary. The breaker was one of the largest structures of its kind in the lower coal-field, and was built in 1874. It was valued at $100,000; the insurance is $27,000.

NEW BUCK MOUNTAIN COAL COMPANY.—This company's breaker, situated near Buck Mountain, Schuylkill County, was destroyed by fire on the morning of the 19th inst. The loss is estimated at $100,000. This fire is supposed to have been the work of an incendiary.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to November 19th:

	1887. Gallons.	1886. Gallons.
From Boston	3,645,149	5,187,952
Philadelphia	147,987,619	135,620,081
Baltimore	6,898,141	13,788,216
Perth Amboy	14,959,865	5,648,102
New York	332,783,037	350,563,682
Total exports	506,273,811	510,808,033

TENNESSEE.

DAVIDSON COUNTY.

LAVERGNE MINING AND MANUFACTURING COMPANY.—This company has a fine deposit of sienna near Nashville, and is now erecting suitable machinery for the purpose of grinding and putting its product upon the market. The officers are: Jas. M. Quarles, President; Joseph Engles, Vice-President; D. W. Quarles, Secretary.

MAURY COUNTY.

SHOAL CREEK IRON COMPANY.—This company has put in extensive washers on a new plan at the Powell ore bank on the Nashville, Florence & Sheffield Railroad, and is shipping daily 100 tons of ore to Birmingham and Cowen. By spring they will have opened the celebrated Vanleer bank, when they propose to ship 500 tons per day. The Vanleer bank is just at the edge of the property of Iron City, which is said to be the coming town of this section of the country.

UTAH.

JUAB COUNTY.

UTAH VALLEY IRON MINING AND MANUFACTURING COMPANY.—This company, which is making paint from the oxidized iron ore taken from the company's iron mines at Tintic is meeting with success. Although commencing with very limited facilities, its first operations were in every way a success, and a demand is now made on the company from all parts of the territory and elsewhere.

SUMMIT COUNTY.

CRESCENT MINING COMPANY.—The report presented at the annual meeting recently held in Salt Lake City shows that the company's finances for the fiscal year, showed the total receipts to be $191,884.92, including $150,922.59, the amount of the ore sales. There were disbursed on mine-operating, ore transportation and reduction accounts, $114,865.18; improvements, $48,176.47; general expense account, $12,349.90; other items, $16,493.47, including boarding-house expense, making the two grand totals equal. Owing to the many unexpected difficulties in placing the machinery the product of the mine was necessarily diminished this summer. The manager's report showed the resources of the company to be $207,664.77, the excess over the liabilities being $155,981.38. The total profits were $100,473.87. The old board of directors and officers was re-elected, except as to the substitution of R. N. Baskin's name for E. P. Ferry's, on the directory. It was voted not to reduce the number of shares from 600,000 and increase the par value thereof.

UTAH COUNTY.

AMERICAN ASPHALT COMPANY.—This company is shipping twenty car loads of asphaltum from its mines near Thistle station, on the Denver & Rio Grande Railroad, to St. Louis, for the purpose of testing the machinery which has been made there for working this material. The machinery is all set up at St. Louis simply for making this test of its adaptation, prior to shipping it to the works near the mines. A tramway a half-mile long has been built to take the asphaltum rock from the mine to the works. The company has spent the past year about $14,000 in the way of improvements about the mine, and a large amount has been spent in designing new machinery. In opening the mine a large body of pure asphaltum has recently been struck. It is found in strata and seams through the rock and in bodies of white sand.

VIRGINIA

RAY COUNTY.

An interest in the Shotwell & Hubbell mine at Richmond has been sold to St. Joseph parties for $6000.

The new firm will be Hubbell, Hyatt & Hanna. New and valuable improvements will at once be put in, and the capacity of the mines nearly doubled.

RICHMOND COAL COMPANY.—Messrs. Hughes & Co. have formed a syndicate with other parties of St. Joseph, organizing the above company, with a capital of $1,000,000. The facilities for mining at the company's mines at Richmond will be improved, steam machinery will be put in for hoisting, and the force greatly enlarged.

SCULLIN COAL AND MINING COMPANY.—This company has disposed of its two mines near Richmond to D. McCoul, of St. Joseph, for $16,000. It is understood that the purchase was made for the St. Joseph and Grand Island Railroad Company.

WASHINGTON TERRITORY.

Eugene Semple, the Governor of Washington Territory, in his annual report to the Secretary of the Interior, estimates the population of the Territory at 143,669, an increase of over 16,000 in the last two years. The report says that there are about 16,631,000 acres of agricultural lands yet unsurveyed; and while all accounts agree that the choicest lands are now taken, there yet remains a great deal of excellent land for entry under the various land laws. About 136 miles of railroad have been completed during the year, making the total mileage in the Territory about 1060. The development of mines is only partially advanced, except as to coal, concerning which, the report says, enough is known to justify the claim that Washington Territory is the Pennsylvania of the Pacific Coast. The New-Castle mine alone has produced over 145,000 tons of coal yearly for the last eight years. The total output of all the mines for the year was 525,705 tons.

WISCONSIN.

ASHLAND COUNTY.

BESSEMER IRON MINING COMPANY.—Articles of dissolution were filed at Madison on the 18th inst. by this company of Milwaukee, the company in which Moore, Benjamin & Co. was so extensively interested.

LA FAYETTE COUNTY.

The discovery of a cave in the town of Shullsburg, Wis., containing thousands of tons of black jack, or zinc blende, is reported.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Nov. 25.

Statistics.

Production Anthracite Coal for week ended November 19th, and year from January 1st:

TONS OF 2240 LBS.	1887 Week.	1887 Year	1886. Year.
P. & Read. RR Co..	185.039	6,660,934	10,273,049
Cent. R. R. of N. J.	91,748	4,310,018	*
L. V. RR. Co.....	118,866	5,365,061	5,441,320
D., L. & W. RR. Co.	171,550	5,270,789	4 517,820
D. & H. Canal Co..	105,172	3,490,788	3,150,661
Penna. RR.....	55,512	3,259,304	3,025,662
Penna. Coal Co.....	37,551	1,394,047	1,245,809
Penna. Canal Co....	19,584	468,305	458,888
N. Y., L. E. & W. RR.....	.....	†628,935	595,507
Total.....	785,022	30,848,181	28,708,716
Increase	34,306	2,139,465	.....
Decrease	.....	.....	.....

* Included in tonnage of Philadelphia & Reading RR.
† Tonnage to November 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1882.....	26,342,109	1884.....	27,815,367
1883.....	28,773,476	1885.....	27,650,187

Production Bituminous Coal for week ended November 19th, and year from January 1st:
Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1887. Week.	1887. Year.	1886. Year.
Phila. & Erie RR.....	600	19,477	14,285
*Cumberland, Md....	79,959	2,872,481	2,228,141
*Barclay, Pa.....	3,813	160,954	160,393
Broad Top, Pa.			
H. & Broad Top.. RR.	8,303	304,418	337,347
Clearfield Region, Pa.			
Snow Shoe	3,165	143,703	96,342
Karthaus (Keating).	3,984	168,824	126,996
Tyrone & Clearfield..	66,930	2,804,850	1,946,369
Tipton.....	296	14,381	.....
Alleghany Region, Pa.			
Gallitzin & Mountain.	20,483	828,954	602,789
Pocahontas Flat Top Coal.			
Norf'k & West. RR...	29,519	1,006,625	761,370
Kanawha Region, W. Va.			
Ches. & Ohio RR....	†35,000	1,425,567	1,115,750
Total	252,052	9,760,184	7,389,782

* Tons of 2240 lbs.
† Estimated.

WESTERN SHIPMENTS.

Pittsburg Region, Pa.			
West Penn RR.....	8,920	268,747	283,308
Southwest Penn. RR.	2,732	104,082	138,365
Pennsylvania RR....	5 844	184,691	248,071
Westmoreland Region, Pa.			
Pennsylvania RR....	33.510	1,403,226	1,119,009
Monongahela Region, Pa.			
Pennsylvania RR....	9.114	375,710	357,292
Total.....	60,110	2,336,456	2,146,045
Grand total.....	312,162	12,096,640	9,535,827

Production of Coke on line of Pennsylvania RR. for week ended November 19th, and year from January 1st.
Tons of 2000 pounds.

	1887. Week.	1887. Year.	1886. Year.
Tyrone & Clearfield ..	....	1,750	.....
Allegnany Region ...	5.416	222,458	170.343
West Penn. RR.....	1,224	97,807	96,152
Southwest Penn.RR .	72,905	1,512,014	2 393,163
Penn. & W. Region..	11,973	319,873	293,385
Monongahela..	1,757	106,798	128,079
Pittsburg Region....	....	38	108
Snow-Shoe..... ...	1,559	48,201	25,016
Total...	94.914	2,308,939	3,106 246

Anthracite.

This market, though active, is somewhat easier, due to the mild weather, to somewhat better supplies of coal, and to less fear for the future. It is understood that the Lackawanna & Western Company has announced that it will sell coal for the Eastern markets after 10th December at $4.75 a ton for Stove and Nut, and this has somewhat relieved anxiety. There will before long be more coal coming here, and all other markets are easier than this.

The companies now at work are pushing their output to the utmost, and as many of the miners from the districts on strike have gone to the mines at work they are able to make a very heavy production. It is said that the D., L. & W. Co. is producing 30,000 tons a day, and since the fine sizes are not so easily placed, and do not pay as well as the domestic sizes, it is said the company is dumping out pea coal and buckwheat coal with the culm.

There is nothing new from the Lehigh strike, except the burning of one of the Pardee breakers and one of Coxe Bros.' breakers, the No. 2, at Drifton. These fires were probably of incendiary origin, for the Coxe breaker was working in a small way, and twenty more of the old hands had just offered to go to work, and were to have commenced the day after the fire.

We are informed on what we consider excellent authority that the Reading Company's compromise with its men guaranteed the 8 per cent. advance over the basis *up to Jan. 1st*, after which a new deal is to be made.

It is easy, therefore, to understand that enormous efforts will be made by the Knights to keep the Lehigh men out until after a new deal has been made with the Reading, for if the Lehigh men went in at the old basis there would be small chance for the Reading men to get again the advance they have until January.

On the other hand, it is certain a great many of the Lehigh miners are anxious to go to work on the old basis, and unless the Knights send them much more liberal supplies there will soon be a general break. The operators are inflexible and will undoubtedly remain firm, the best part of the market being now past. December is always rather a dull month.

Prices are nominally unchanged, but there is certainly less anxiety to buy.

The following may be considered as fair ruling rates for standard free burning coals:

Broken, $4@$4.25, and in good demand. Egg, $4.50@$4.75, with even a better demand than for broken. Stove and Nut, $5.25@$5.75, about the same for each, with coal scarce. Pea is easy at about $2.75 to $3.

Bituminous.

The demand continues in excess of the supply and $3.50 is readily obtainable while the best known coals can command $3.75.

There are no new features in the market, cars are still scarce, and the companies are far behind in filling their contracts. We hear of a few small contracts for next year's delivery having been taken at the prices of this year, and we see no reason to expect much, if any, advance for the next year.

Boston. Nov. 22.

[From our Special Correspondent.]

The market for anthracite coal at this port is of extremely narrow dimensions as far as jobbing trade is concerned. Matters do not improve, but, on the contrary, are worse than ever. It is not a matter of price but of ability to ship coal. This is owing to the fact that some of the retailers in and about Boston are beginning to be greatly in need of coal, and their exigency makes the market. Although the nominal f.o.b. price of stove coal at New York is $4.75, an advance of from 50 to 75 cents is being freely paid. The situation is nearly as bad in egg coal, for which $4.75 can be readily had. Broken is not quite so scarce, and pea and buckwheat are in much better supply, relatively, than stove and egg, though there is no large stock of any thing. I hear pea quoted at $2.50@$2.75 f.o.b., at New York, and buckwheat at $2@$2.25. It is very hard to give quotations in such a market as this, and buyers will have to find out for themselves. The tendency, however, is toward firmer figures. A portion of the trade are talking present high prices, if not higher, for 60 days yet, and all acknowledge that the likelihood of a sharp decline in December is not nearly as great as it was thought to be a fortnight since. Still two months time gives opportunity for the production of an immense amount of coal, and the anthracite market has more than once changed from strength to weakness in a remarkably short space of time.

Bituminous coal is firmer than ever, owing to the difficulty in delivery, both by rail and water freights. I hear nothing below $2.60 f.o.b., and $2.70 is also asked.

No one knows what freights are until he tries to charter. They are, in general, unprecedentedly high for this season, and also very irregular. The matter of detention in loading is the main cause for this, and rates vary according to detention, so that a wider range is necessary than is usually given. We quote, exclusive of discharging: New York, $1@$1.25; Philadelphia, $1.25@$1.50; Baltimore, $1.50@$1.60; Hampton Roads, $1.25@$1.50.

There is a good trade at retail, though the mild spell of late has quieted things a little, to the slight relief of the overcrowded dealers. Prices have been advanced, as I have said, would be the case if the wholesale market held up. The advance has been 50 cents per ton, and it is also proposed to reduce the option from 60 days to 30 days. Delivered prices are: Stove, $7; Nut, $7; Egg, $6.75; Broken, $6 50; Lykens Valley, $8.25; Lehigh Egg, $7; Broken, $6.75. Wharf prices, 50 cents less per ton. The price of wood has also been advanced from $1.25 to $1.40 per foot for hard wood, and from $1 to $1.12½ for soft, delivered in each case.

Buffalo. Nov. 23.

[From our Special Correspondent.]

With regard to this market no new features in the coal trade have to be reported. The shipping season by water will probably be ended ere this letter reaches you, and Western dealers will be enabled to calculate to what extent they will have to rely upon the rail movement to keep them supplied with bituminous and anthracite coal until the opening of navigation in 1888.

All engaged in the coal trade will have reason to enjoy the Thanksgiving festival this year, and may look forward to Christmas and New Years without any fear of impecuniosity or with trembling anxiety.

Mr. Goldwin Smith, in a letter addressed to the London (Eng.) *Times* says: "The attempt to force the upper Provinces of Canada to use Nova Scotian instead of Pennsylvania coal by imposing a duty on imported coal has totally failed."

"Coal is discovered not far from Duluth, as western distances go, on the direct line of a railroad from Duluth to Denver, now under construction. If the vein develops as expected, Duluth and the Northwest is freed from the rapacity of the coal barons, Duluth's cheap fuel becomes yet cheaper, and an important point is gained in the problem of manufactures;" so says the Lake Superior *News*.

Since last letter the weather on the Lakes for three or four days was very tempestuous, resulting in heavy losses in property and a few lives. Yesterday and to-day, temperature higher, with light wind. The change has entirely altered the condition of affairs relative to navigation on the lakes and canals, and at present writing every thing is moving satisfactorily, but who knows what weather "Old Probabilities" will give us to-morrow?

Lake freights steady, small shipments daily. The going figures for the past week were as follows: $1 to Chicago and Milwaukee, 50c. to Detroit, Duluth, Bay City and Cleveland; 50 to 75c. to Toledo; 75c. to Port Huron; and $3 to Sault Ste. Marie. The latter price was paid under exceptionable circumstances, such as the lateness of the season, dangers of navigation, etc., etc.

The shipments of coal westward by lake from November 17th to 22d, both days inclusive, were 42,580 net tons, namely, 21,450 to Chicago, 4850 to Milwaukee, 6050 to Toledo, 2300 to Duluth, 3780 to Detroit, 1150 to Cleveland, 400 to Sault Ste. Marie, 100 to Bay City and 500 to Port Huron; total for season 1,685,311 net tons, not including vessels from Tonawanda, which load here without reporting at Custom House.

Receipts by canal at this port for third week of November, 1362 net tons; the shipments, 352 net tons. No charters made public. Navigation all right.

Pittsburg. Nov. 24.

[From our Special Correspondent.]

COAL.—The features of the market are about the same as last week. No movement is looked for until we have a rise in the Ohio. The market here is firm at quotations. The stock of coal at Cincinnati is about exhausted, with none for sale except in a retail way, at a further advance of 20@23 cents per 100 bushel.

PRICE OF COAL PER 100 BUSHELS.

First pool.....	$4.75	Fourth pool.....	$3.25
Second pool.	4.25	Railroad coal....$5.00@5.25	
Third pool.....	3.75		

CONNELLSVILLE COKE.—Demand fair, cars very scarce. Stocks in yard accumulating. Prices are: Blast Furnace, f.o.b., $2 per ton; Foundry, $2.30; Crushed, $2.60.

LATEST.—The prospect at this writing is good for a rise in the Ohio about Sunday. Every thing in good shape for coal shipment.

FREIGHTS.

The latest actual charters to November 25th, per ton of 2240 pounds:

From Philadelphia to:—Alexandria, 1.05; Annapolis, 70; Baltimore, 60§; Boston, 1.60@1.80; Brooklyn, 90§; Chisea, 1.75@1.80*; East Boston, 1.60@1.80*; Galveston, 3.50; Georgetown, D. C., 1.05; Gloucester, 1.75*; Lynn, 1.65@1.70; New York, 90§; Richmond, Va., 75; Savannah, 1.25; Washington, 1.05.

From New York to:—Boston, 1.50@1.25*; Bridgeport, Conn., 75; Bristol, 90; Cambridge, Mass., 1.10*3c.; Cambridgeport, Mass., 1.10*3c.; Charlestown, $1.10*; Chelsea, 1.10*; Com. Pt., Mass., 1.10*; E. Boston, 1.10*; E. Greenwich, R. I., 1.00; Fall River, 1.00; New Bedford, 1.00; Newburyport, 1.25*; New Haven, 80; Newport, 90; Norwich, 90; Portland, 1.10*; Portsmouth, N. H., 1.20*; Providence, 1.00; Salem, 1.10*; Somerset, 1.00.

* And discharging. † And discharging and towing. 3c. per bridge extra. § Alongside. ‖ And towing up and down. ¶ And towing. †† Pilotage. ** Below bridge. * Old B. L.

MARKETS.

NEW YORK, Friday Evening, Nov. 25.

Prices of Silver per ounce troy.

Nov.	Sterling exchange	Lond'n Pence.	N. Y. Cents	Nov.	Sterling exchange	Lond'n Pence.	N. Y. Cents
19	4.85	*	95¼	23	4.85	†	95¼
21	4.85	43⅞	95¼	24	4.85	43⅞	95¼
22	4.85	43⅞	94¼	25	4.85	‡	95⅛

* 43⅞@44. † 43 15-16. ‡ 43 13-16.

Market has been steady, but closes somewhat weaker, owing to the increase of 5 lacs rupee bills to be offered next Wednesday.

Foreign Bank Statements.—The statement of the Bank of England for the week ended the 23d inst., showed a decrease of £35,000 bullion. The proportion of the bank's reserve to liability, which last week was 47·72 per cent, is now 48·23 per cent. In Paris the 3 per cent rentes, which yesterday were up to 81·70 from 81·15 on Wednesday, on Friday receded to 81·50. The weekly statement of the Bank of France shows an increase of 4,525,000 francs gold and 4,100,000 francs silver.

Copper.—Since reviewing last an incident occured which could not but strongly influence this article. Telegrams were received on the 20th inst. that a new fire had broken out in No. 1 Hecla shaft on the 17th level of the Calumet & Hecla mine, and all this mine, save the scuth end, had to be closed up. Although it is of course impossible to estimate the damage, fears are entertained that the prospects are worse than at the last fire.

Telegrams received from the vicinity of the mine to-day from our own correspondent say: "The shafts are all closed and carbonic acid gas is being forced into the mine. The situation is said to be now favorable, but this is merely conjecture until the mine has been reopened."

Professor Agassiz is said to have announced already that the fire is extinguished. This we think is premature, but experience and past success give a hopeful tone to the reports.

This fire will seriously curtail the output of this important mine for weeks to come, and the trade is somewhat alarmed at the prospect that a scarcity of fine copper will be felt later in the winter. The unwelcome news was most felt in London, where the demand for the better grades of copper is very strong, and, backed up by a strong speculation, prices jumped up with leaps and bounds. Chili bars, which closed last week at £49 5s. cash, were on Monday £50 5s.; Tuesday, £51 10s.; Wednesday, £54 15s.; Thursday, £56 5s.; Friday, £57 15s. cash, and £58 7s. 6d. three months prompt.

Our domestic market followed the London lines and prices for Lake spot rose from 12·30c. on Saturday to 13·30c. on Wednesday, and with large transactions amounting to about 2,000,000 pounds. The week closes very firm at 13·95c. spot. 14c. December, 14·10c. January, 14·15c. February, 14·20c. March. The deliveries of Chili bars in Swansea and Liverpool amounted to about 1500 tons for the first half of the month, but arrivals from Chili in Europe will be pretty heavy this month. In furnace material the stocks in England are reported very low, and early this week 500 tons Anaconda Matte were sold at £10 Liverpool.

Tin is again higher, and London gradually improved from £140 10s. to £151, which, being above the parity of New York, some reshipments are in progress to London. The deliveries, as expected, show a marked falling off, and the buying of consumers is restricted to the most urgent wants.

Prices for spot were irregular, but more active on the close, with firm tendency; some speculative transactions took place for late deliveries.

We quote Spot 32½@32¾c., while January was sold from 30·50 to 31c.

Tinplates move slowly, although stocks are light.

Lead was dull and unchanged in the beginning of the week, but with small offerings prices improved at the end and several hundred tons sold at 4·45 to 4·50c., at which price buyers remain.

Messrs. Everett & Post, of Chicago, telegraph to-day as follows: Our market has shown no change. There is but little doing, the demand being from hand to mouth only, while scarcely any thing has been offered. Refiners are stiff in their views, and won't name prices for futures: Market closes nominally 4·22½@4·25c.

Messrs. John Wahl & Co., of St. Louis, telegraph us as follows to-day: Our market is stronger and sales have been made during the week at 4·10@4·15@4·20c. At the close no lead could be obtained below 4·22½@4·25c. Buyers fearing an advance are taking lead more liberally. Solders are offering supplies sparingly.

Antimony is quiet but firm, at 9¾c. for Cookson's, and 9¼c. for Hallet's.

Spelter.—The improvement is fully maintained, and domestic remains 4·90@5c. Sheeting 6¾@6¾c. Europe is again firmer, and Silician can not be bought below 5⅝@5¾c. New York, with only small quantities offering.

Sheet Zinc remains active at 6¾@7c.

Nickel remains in a satisfactory position, with quotations unaltered at 65c.

Quicksilver.—The market is unchanged, the price remaining at $42½ per flask. The English quotations show £7 15s.

Chemicals.—The chemical trade has been devoid of any special feature throughout the week, owing partly to a lack of consumptive demand from the interior, but in a greater degree to the general interruption of business in connection with the national holiday. In the ordinary way, a falling off or decrease in activity of the demand is accompanied by a weakening in prices, but in the present case there is no such tendency, owing to the regulation of the stocks, which continue to be so provided as to no more than feel the small orders that are coming forward. While bleaching powder continues to find such a ready market at the now prevailing price, we can not expect to see any lower rates for the various other chemical compounds incidental to Leblanc's process, and on the other hand it is evident, as we have before pointed out, that if means are devised for producing chlorine on a commercial basis by the ammonia soda process, the application of discovery will send up the present price of soda. While the Leblanc makers occupy their present strong position in the enjoyment of a practical monopoly of the bye-product they are independent of any more that may be made by their rivals, since by putting up the price of bleach they can compensate themselves for any fall in soda, and will rather have a tendency to deprecate than to encourage any attempt to better the position of the latter product.

English and American sal soda are both in very moderate demand, but firm and unchanged in price since our last report. At the beginning of the week we were informed of two or three small sales of 20 to 30 tons each at ordinary rates for English at 1·10c., and at a slight advance in the domestic article.

Newcastle and Liverpool brands of soda ash meet with slight inquiry, the demand being entirely confined to the small jobbers and for hand to mouth consumption. It is reported that no sales are made at less than $1.27½ for either variety in store, and that sellers are decided to accept no orders for arrival, even in large lots, within the next three months at less than $1.22½@$1.25. Refined alkali has been in somewhat more active demand than when we last wrote, but prices have undergone no change. Caustic soda is devoid of any novelty, and has been neglected very severely by all classes of buyers for immediate delivery. Some demand has, however, been made for 70 per cent future delivery, and sales are recorded at $2.37½ for good qualities and best brands. Other percentages are dull and neglected.

From England our correspondents write that there are no new features to report, the chemical market being firm and tolerably active. Caustic soda is in demand for both spot and forward delivery at £6 2s. 6d. for 60 per cent; £7 5s. for 70 per cent, and £8 2s. 6d @£8 5s. for 74 per cent, best brands. Sal soda still sells at £2 10s.@£2 15s. for best make, and sulphate or salt cake is neglected, as it generally is expected to be at this time of the year. Bleaching powder is in considerable demand from all sides, and manufacturers are extremely cautious, seeking only to sell small lots at £8@£8 2s. 6d. for both spot and forward delivery. There is no attempt to increase the production, and consequently no liklihood of a fall in value in the ordinary course of affairs.

In sulphuric acid we have nothing new to report; prices are unchanged and business dull. Brimstone is stationary at prices and quotations given last week. Nitrate of soda continues to be very firmly held for both spot and forward delivery at about 2⅛c. In all other chemicals we refer to our weekly register of current quotations.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Nov. 25.

The iron market is decidedly quiet, with very little new business. The general feeling is that there will be plenty of business next year. Opinions as to prices vary chiefly with the interests of the parties expressing them. A careful review of the situation shows that while the consumption for 1887 has been enormous, yet the production has fairly kept pace with it, and in some instances threatens to be somewhat in excess. In pig-iron, for instance, if all the preparations for starting new furnaces are carried out, there will doubtless be an overproduction, unless prices can be so adjusted in relation to the tariff as to prevent importations. This will mean that more and more of the Northern furnaces will run on Bessemer iron, and will produce it at such prices as will prevent importations. There is a present scarcity only of No. 1 foundry brands. We have frequently called attention to the fact that the Southern irons are gradually replacing Scotch irons for many purposes. The outlook, on the whole, does not indicate higher prices for pig-iron, nor is it likely that prices will be lower, unless there shall be a material reduction in wages.

The present demand for Scotch irons is a little better than a few weeks ago, and prices are rather firmer.

Bessemer pig and spiegel are neglected.

Some business has been done in Bessemer billets and wire rods, the latter being a little higher on account of the recent combination of the German manufacturers.

The situation in the steel rail market is substantially as we reported it last week. There has been no general agreement to close the mills for a period, and there is a general understanding that $32 at mill is the bottom price. At this figure, as we pointed out last week, some of the mills can not manufacture at a profit. Some recent orders for spring delivery have been taken at $32, others a little later at $32.50. There is considerable inquiry, and several large orders are on the market and likely to be closed before many weeks. The mills will doubtless generally close for repairs in January, after the enormous business of this year. One important factor in the rail business is that many of the trunk lines are using heavier locomotives and cars, and are increasing the sections of their rails to correspond to these and to the general increase of speed of trains. Eighty-pound rails are about as common now as were sixty-pound rails a few years ago. This changed condition demands replacements in addition to increased tonnage per mile.

Old rails continue in the same unsatisfactory condition as regards quotations. Very little business has been done, and buyers still apparently believe that they can supply their needs below the figures at which old rails are offered. The stocks on hand, while considerable, are not excessive. Quotations are purely nominal, as old rails can not be imported at offering prices here.

The *Bulletin of the Iron and Steel Association* of Nov. 23, states:

The exports of iron and steel to this country from Great Britain during October were much smaller than during several preceding months, as the following table of exports since July will show. In July itself the exports amounted to 117,139 tons.

ARTICLES.	Gross tons.			
	Aug., '87.	Sept., '87.	Oct., '87	10 mos., '87.
Pig-iron	36,764	44,590	23,901	355,227
Old iron	14,537	8,183	8,826	164,671
Steel unwrought	20,055	12,986	16,188	199,398
Tin plates	22,558	24,495	24,784	228,575
Hoops and sheets	3,751	6,221	2,859	30,161
Bar, angle, etc	218	548	622	3,039
Rails	19,890	22,790	14,751	150,372
Cast and wrought	245	272	211	2,449
Total	118,018	120,085	92,142	1,133,892

The decline in October is mainly shown in the two articles of pig-iron and steel rails. The exports to this country from Great Britain in the ten months of 1887 amounted to 1,133,892 gross tons, which is a much larger quantity than the total imports of iron and steel by the United States from all countries in the whole of 1886.

Louisville, Nov. 22.

[Reported by GEO. H. HULL & CO.]

The market has been rather active during the past week, although prices at which purchases were made showed a further decline from last week. Around lot of mill iron was disposed of in this market, but very little was done with foundry grades. The effect of the low prices at which steel rails are rumored to have been sold, is responsible for a part of the unsteadiness of the market. Buyers have not been willing to purchase round lots, save at a considerable conces ion from present market prices where purchases were made for next year. There seems to be on the part of the furnaces a desire to sell for next year, and to such buyers low prices have been offered. For immediate delivery in small lots, the furnaces are asking about the same prices that were quoted last week. We quote for cash in our weekly register of current quotations.

Philadelphia, Nov. 24.

[From our Special Correspondent.]

The only change in the crude iron situation as against this time last week is that there are quite a number of buyers in the market making inquiries, and in some cases making bids, and in not a few cases making actual purchases for delivery after January 1st. Inquiries show that the irons which are selling are of the better grades, and that the prices paid are the full quoted rates as a rule. Some few large buyers have succeeded in contracting for good irons at what they regard as concessions, but few makers are disposed to meet buyers half way. But taking trade as a whole, full prices are being realized, and the full furnace output is being sold. There are quite a number of furnace companies which are considering the wisdom of blowing out their furnaces, some few for repairs and others because there is not enough in iron at present prices. The decision will probably be against a blowing out beyond what repairing requirements demand. For best No. 1 iron full prices can be realized without any difficulty. In fact, there is very little to be had excepting for delivery from thirty to ninety days ahead. The poorer brands of foundry are not weak by any means, and stocks are not to be found on furnace banks excepting here and there. The makers have whatever advantage there is in the present situation. Buyers realize this, and know there will be a steady demand for good foundry and forge iron all winter. The forge iron makers have been selling a good deal of material all along, and have not enough capacity to cause them any worry. They feel there will be no difficulty in disposing of their entire production from now to next spring. Muck bars have been selling very well at full quoted prices. A great deal of car work is being done, and common and medium iron, as usual, can be sold without difficulty, and that, too, at full quoted prices. There is a stronger feeling this week than last on account of the anxiety of railroad companies, West and East, to get in orders for cars for next spring. Nails are weak and dull, and there is not much prospect for an improvement, and not much for a decline, as there is no room. Plate and tank are without particular change The sheet-iron makers have nothing to report. Skelp iron will sell as fast as mills are able to make it, at full quoted prices. There is no downward tendency

WEEKLY REGISTER OF

CURRENT QUOTATIONS.

This list is the result of careful compilation and is destined to meet the demands of all classes of subscribers. The prices quoted are those actually ruling in our own and foreign markets. Manufacturers and importers will please give notice of all modifications not later than Friday noon each week.

CHEMICALS.

Acid—Sulphuric, 60°, per 100 lbs.. 80
Sulphuric, 66°, per 100 lbs 90
Hydrofluoric, per 100 lbs..... 95
Muriatic, 18°, per 100 lbs 1.15
Muriatic, 20°, per 100 lbs..... . . 1.25
Nitric, 36°, per 100 lbs..... 4.00
Nitric, 42°, per 100 lbs..... .. .... 6.00
Alkali—36 p. c 1.10
Refined, 58°..... ..... 1.15
Alum—Lump, per lb..... ..... 1¾
Ground, per lb..... 2
Lump per ton, Liverpool £5
Sulphate of Alumina £4 12 0
Aluminum—(Metallic), per lb...12.00
Ammonia—Sulph., per 100 lbs.. 3.00
Carb, per lb..... 7¾
Muriate, per lb... 7
Antimony—Hallet's, per lb..... 8¼
Cookson's, per lb 9¼
Arsenic—Metallic, per lb..... 3¢
White, powdered, per lb..... 2¾
White, glass.. . ..
Red, per lb 6½
White, at Plymouth, per ton. £21 0 0
Asbestos—American, p. ton..... 20.00
Italian, p. ton, c. i. f. L'pool ...£18 0 0
Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb .. .. 5@6c.
Hard, ℔ ton..... ..... $28.00
Trinidad, refined, ℔ ton $30.00
Barium—(Metallic), per lb..... 975.00
Barytes—Sulph., Am. prime white 16.00
Sulph., foreign, floated, p. ton....19.00
Sulph., off color, p. ton 12.50
Carb., lump, f.o.b. L'pool, ton... £6 0 0
No. 1, casks, Runcor " "£4 10 10
No 2, bags, Runcorn " " 3 15 0
Bismuth—(Metallic), per lb..... 2.40
Bleach—Over 35 p. c., per lb..... 2¼
Borax—Per lb 6¼
Refined at Liverpool, per ton..£26 10 0
Bricks—Pale, per 1,000 ..... 5.00
Jerseys, per 1,000 .. .. 7.50
Haverstraw, per 1,000 .... 8.50
Front bricks, per 1,000, from.....10.00
Brimstone—*See Sulphur.*
Bromine—Per lb.... 36
Building Stone—Amherst free-stone, per cu. ft., from..... 75
Brownstone, per cu. ft., from..... 1.00
Granite, rough, per cu. ft., from.. 45
Cadmium—(Metallic), per lb..... 1.45
Calcium—(Metallic), per oz.....150.00
Cæsium—(Metallic)..... .....
Cerium—(Metallic) per oz..... . 168
Cement—Rosendale, per bbl..... 1 00
Portland, American, per bbl..... 2 00
Portland, foreign, per bbl..... .... 2 25
Chalk—Per ton..... .... 3.00
Precipitated, per lb..... 4
China Clay—English, per ton....18.50
Southern, per ton..... .....13.50
Chrome Yellow—Per lb 8
Chromium—(Metallic), per lb...200.00
Cobalt—(Metallic), per lb..... 7.00
Cobalt—Oxide, per lb..... ... 2.15
Copper—Sulph. English Wks., ton £13 10 0
Precip., English Works, unit..fluctuating
Copperas—Common, per lb ....$ 70
Best, per lb..... ..... 1.20
Liverpool, per ton, in casks, £2... 1.20
Cream of Tartar—Am. 99 p. c. lb 35
Powdered, 99 p c..... 36
Didymium—(Metallic), per oz...160.00
Emery—Grain, per lb 3½
Flour, per lb 2½
Erbium—(Metallic), per oz.....140.00
Feldspar—Ground, per ton.....14.00
Fuller's Earth—Lump, per bbl. 95
Powdered, per lb.. 2
Gallium—(Metallic), per oz 3250.00
Glucinum—(Metallic) .....
Green—Emerald, per lb..... 25
Brunswick..... ..
Gypsum—Calcined, per bbl..... 1.25
Indium—(Metallic), per oz..... 158.00
Iodine—Resublimed..... 3.50
Iridium—(Metallic), per lb.....700.00
Kainit—Per ton..... ..... 7.25
Kaolin—*See China Clay.*
Lanthanum—(Metallic), per oz.175.00
Lead—Red, per lb..... 6
White, American, in oil, per lb.... 6½
White, English, per lb 7½
Acetate, or sugar of..... 12
Litharge—Powdered, per lb..... 5½
English flake, per lb..... 9
Lithium—(Metallic), per oz.....160.00
Magnesite—Syrian, per ton.....15.00
Magnesium—Per lb.... ..... 4.00
Mineral Wool—Per lb 2
Mica—
In sheets according to size, 1st quality, ℔ lb..... ..
In sheets according to size, 2d quality, ℔ lb..... .....
Molybdenum—(Metallic) per lb. 6.00
Nickel—(Metallic), per lb.. .....125.00
Niobium—(Metallic), per oz.....128.00
Osmium—(Metallic), per lb 640.00
Palladium—(Metallic), per lb...512.00
Platinum—(Metallic), per lb ..148.00
Phosphate Rock—S. Carolina, per ton f. o. b. Charleston..... 5.80
Ground, per ton f. o. b. New York.10.00
Canadian Apatite, lump, f. o. b. at shipping port, per unit..... 24
Manganese—lump, c. i. f. Liverpool, per ton.....£3 2 6
Per unit, up or down..... .....£0 1 3
Ground..... .....£6 0 0
Metallic, per lb 1.10
Mercury—*See Quicksilver.*
Mercuric-Chloride—(*Corrosive Sublimate*) per lb..... 55
Phosphorus—Per lb..... 70
Plumbago—Ceylon, per lb..... . 4
American, per lb..... 7
London, per cwt..... .. ..£0 15 0
Potassium—Metallic, per oz..... 2.00
Cyanide, per lb 37
Bromide, per lb..... 37
Chlorate, per lb..... 14
Carb. per lb. 5
Caustic, per lb..... 7½
Iodide..... .... 2.10
Muriate, per 100 lbs..... 1.70
Nitrate, refined, per lb.... 6
Bichromate, per lb.... ..... 10½
Sulphate, per 100 lbs..... .. .. 1.10
Yellow Prussiate, per lb.... 19
Red Prussiate, per lb... 42
Pumice Stone—Select lumps, per lb..... ..... 2½
Original cks., per lb..... . ..... 1½
Powdered, pure, per lb.. . ..... 1¾
Pyrites—Non-cupreous, p. unit, s. 10
Quartz—Ground, per ton 18.00
Quicksilver—Per lb..... 53
London, per flask of 75 Ho....£7 15s. 0d.
Rotten Stone—Powdered, per lb. 8½
Lump, per lb... 5
Eng., powdered, per ton £4
Lump, per ton..... ..... £5
Rhodium—(Metallic), per lb....512.00
Ruthenium—(Metallic), per oz.112.00
Rubidium—(Metallic), per oz...200.00
Salt—Liverpool, ground, per bbl. 70
Turk's Island, per bbl 25
Salt Cake—Per 100 lbs..... 55
Saltpeter—Crude, per lb... ... .. 4½
Refined, per lb..... 6
Selenium—(Metallic ....
Slate—Purple and green roofing, per 100 ft.... ..... 6 00
Red roofing, per 100 sq. ft... ....15.00
Black, roofing, per 100 sq. ft. ... 5 00
Soda Ash—Carb., 48 p. c., p. 100 lbs..... .. .. 1.30
Caustic, 48 p. c., per 100 lbs.. . 1.35
Caustic, 70 p. c., per 100 lbs..... 1.18
Sal, English, per 100 lbs 1.30
Sal, American, per 100 lbs 1.15
Nitrate, per 100 lbs..... 2.00
Sodium—(Metallic) per lb..... 4.50
Spelter—See Zinc.
Strontium—(Metallic), per oz..128.00
Nitrate, per lb 10½
Sulphur—Roll, per lb..... .... 1½
Flour, per lb 1¾
Crude Brimstone, 2s., per ton....20.00
Crude Brimstone, thirds, per ton..19.00
Talc—Ground French, per lb.. ... 1¼
Domestic, per lb..... 6
Domestic, per ton..... ... .15.00
C. i. f. Liverpool, per ton... £4 5 0
Tannin—Pure, per lb. .....
Tantalum—(Metallic) per oz... 144.00
Tellurium—(Metallic) per oz..... 9.00
Thallium—(Metallic) per oz..... 3.00
Titanium—(Metallic) per oz....32.00
Thorium—(Metallic) per oz.....272.00
Tungsten—(Metallic) per oz..... 4.00
Vanadium—(Metallic), per oz..320.00
Vermillion—American, per lb... 50
English, per lb. 65
Vitriol—(Blue), Ordinary, per lb.. 4½
Extra, per lb 4¾
Yttrium—(Metallic), per oz 144.00
Zinc Oxide—Am., Dry, per lb.... 4¼
Antwerp, Red Seal, per lb..... 5⅝
Paris, Red Seal, per lb..... 6⅛
Zirconium—(Metallic), per oz..240.00

IRON AND STEEL.

New York Prices.

American Pig-Iron,
No. 1 X.... .$20.50@$21.50 at tidewater
No. 2 X..... $18 50@$19.50 " "
Forge.. .. ... $17@ . .... " "
Scotch Pig—Coltness... .$21.25@$21.50
Clyde.. ..... 19.75@ 20.00
Dalmellington..... 19.25@ 19.50
Summerlee..... 21.00@ .....
Gartsherrie..... 21 00@ .....
Shotts... ..... 21.00@ .....
By Cable to-day to the Metal Exchange :
Scotch Warrants.....40s. 5d.
Coltness, at Glasgow ....50s.
Langloan, at Glasgow.....47s.
Summerlee, at Glasgow.....49s. 6d.
Gartsherrie, at Glasgow.... .....46s.
Glengarnock, at Ardrossan.....46s. 6d.
Dalmellington, at Ardrossan.....41s. 6d.
Eglinton, at Ardrossan ... .41s.
Bessemer Pig—
Foreign, nominally..... $19.75@$20.00
Domestic.
Spiegeleisen—
German, 20 per cent.. ... $26.00
English, 20 " " .....$26 50@ 27.00
" 30 " " 31.00
Ferro Manganese..... 55.50
Steel Blooms..... 30.00@ 30 50
Steel Billets..... 30.00@ 30.50
Steel Nail Slabs..... 30 50@ 31.00
Steel Wire Rods.. .... 40.00@ 40.50
Steel Rails—
Heavy sections, at mill....$32.00@ 32.50
Light " " .... 34.50@ 39.50
Structural Iron and Steel—
Bridge Plate, at mill.. ....2¼@2·3c.
Angles, at mill ....2·3@2·4c.
Tees, at mill..... .....2·6@2·8c.
Steel Angles, at mill..... .....2·6@2·75c.
Beams and Channels, on wharf, 3·3c. base.
Steel Plates—
Tank and Ship, on wharf..... 2·7@2·9c.
Boiler Shell, on wharf... ....3 .....
" Flange, " .... 3½ .....
" Fire-Box, on wharf.... 4 @4¼c.
Iron Plates—
Common tank, on wharf. . . .2·3@2·4c.
Refined tank, on wharf..... .2·5@2·6c.
Boiler shell, " ..... .2·7@2·8c.
Boiler flange, " ....3·7@3·8c.
Extra flange, " .....4¼@4½c.
Bar Iron—
Refined..... .....2@2·1c. base.
Common..... 1·9@2c. "
Merchant Steel—
American tool .... 8½@10c.
Special grades..... 13 @20c.
Crucible machinery..... 5 @6c
" spring..... .... 4½c.
Bessemer machinery..... 2·2@2·5c.
" spring. . .. . 2·2@2·5c.
Cast-Iron Pipe—
According to size..... $28 00@$35.00
Wrought-Iron Pipe—List adopted Oct. 26, 1887.
Butt-Welded, Plain and Tarred, 47½ per cent disc.; Galv., 37½ per cent disc.
Lap-Welded, Plain and Tarred, 57½ per cent disc ; Galv., 45 per cent disc.
Boiler Tubes—52½ per cent disc.; Casing, 50 per cent disc.
Rail Fastenings—
Spikes..... ..... 2·3 @2·4c. delv'd
Angle Fish-bars..... .2·10@2·15c.
Bolts and Sq. Nuts..... 2·9 @ 3c.
" " Hex. " . .....3·1 @3·2c.
Wrought Scrap—
Foreign *ex ship*.....$20.00@$20.50
No. 1 Yard .... 20.50@ 21.00
Cast Scrap .... 15.00@ 16.00
Old Car Wheels.... ... 19.00@ 19 50
Old Rails—Tees ... . 21.50@ 21.75
—Doubles..... 22.00@ 22 50
Nails—In car-load lots. .. 2 00@ ....
—From store .... 2.05@ ...

Louisville Prices.

Pig-Iron—
So. Coke, No. 1 Foundry..$20.00@$20.50
" " No. 2 " .. 19.00@ 19.50
" " No. 2½ " .. 18.00@ 19.00
Hg. Rock Coke, No. 1 F'dry 19.50@ 20.50
" " Charcoal, No. 1 Foundry..... 22.50@ 24.00
So. Charcoal, No. 1 F'dry .. 20.50@ 21.50
Silver Gray, different gr'des 17.50@ 19.00
So. Coke, No. 1 Mill, Neutral 17.25@ 18.25
" " No. 2 " " 16.75@ 17.75
" " No. 1 Mill, Cold Short..... 16.75@ 17.75
So. Charcoal, No. 1 Mill.... ....
White&Mottled, diff't gr'des. 15.00@ 16.00
So. Car-Wheel, St'd Br'nds 23.00@ 24.00
" " Other " 21.00@ 23.00
Hanging Rock, Cold-Blast.. 23.50@ 25.00
" " Warm-Blast 20.00@ 21.50

Philadelphia Prices.

Foundry No. 1..... ... $21.00@22.00
Foundry No. 2. ..... 18.50@19 50
Gray Forge..... ..... 17.00@17.50
Bessemer Pig..... .... 18.00@. ...
Steel Rail Blooms..... 29.50@. ....
Foreign Bessemer..... 20.25@21.00
Spiegeleisen. ..... 27.00@27.50
Scrap, Selected..... 22.00@. ....
No. 1..... ... . 21.00@. ....
Cargo Scrap..... ... . 21.00@.....
Muck-Bars.. .... 31.00@. .....
Merchant Iron..... ..... 1.90@@2.10c.
Plate Iron..... 2.30@ 2.50
Tank Iron..... 2 40@ 2.50
Skelp Iron..... 2.00@..... .
Angles..... ... 2.30@.. ..
Beams and Channels..... .. 3 30@. ..
Nails .... 2.00@ 2.15
Steel Rails. .... 34.00@34.50
Old Rails..... 22.00@22.50

Pittsburg Prices.

Coke or Bituminous Pig—
Foundry No. 1..... ... ..$19.75@20.00
Foundry No. 2..... .... 18.25@19.00
Gray Foundry No. 3..... 17.25@17.50
" " No. 4... .. .. 17.00@17.25
White 17.00
Mottled..... ..... 17.00
Silvery..... .... 19.00
Bessemer..... 19.00@19.50
Charcoal Pig—
Foundry No. 1. .... 25.00@25.75
Foundry No. 2..... . . 24.00@24.75
Cold-Blast..... ..... 26.00@30.00
Warm-Blast..... ..... 25.00@27.00
20 p. c. Spiegel..... ..... 28.00@28.50
Muck-Bar..... ..... 30 50@31.00
Steel Blooms..... ..... 32.00@33.00
Steel Slabs .... 31.00@32.00
Steel Crop Ends..... .... 21.00
Steel Bloom Ends.. .... 20.50
Steel Billets..... ....(dull) 29.50@30.00
Old Iron Rails... .... 24.50@25.00
Old Steel Rails..... .... 23.50@24.00
No. 1 W. Scrap..... ..... . 20.00@20.25
No. 2 W. Scrap..... .... 18.00@18.25
Steel Rails..... .... 35.00@36.00
" light sections... ..... 36.00@39.00
Bar Iron., nominal..... 1.90@ 2.00
Nails $2 net car lots.
Steel Nails $2 net car lots. Two per cent off for cash.

ALUMINUM.

Bronze (10 %), ℔ lb..... 40c.

COPPER.

Lake Ingot, ℔ lb..... ... .
Electrolytic, ℔ lb.... ....
Casting Brands, ℔ lb ... .
Arizona Black.....
Matte, ℔ unit of Copper .....
Chili Bars, London, ℔ ton.....
Am. Matte, Liverpool, ℔ unit....
Sheet Copper (according to size), ℔ lb..... .....20 @33c.

LEAD.

Domestic, Common .....
Domestic, Refined ....
Foreign..... .....
Sheet, ℔ lb..... ..... 5 @ 6c.
Pipe, ℔ lb .. .. 4½@ 5½c.
Tin lined Pipe, ℔ lb.....12c.
Shot, ℔ lb..... 5c.

TIN—

Banca pigs, ℔ lb..... .. ..
English, pigs, ℔ lb..... .....
Straits, pigs, ℔ lb ....
Straits in bars. ℔ lb..... .....
Ch., bright I. C., ℔ box.....
Coke, bright, ℔ box. .....
Coke, Ternes, ℔ box..... ....

ZINC—

Domestic spelter, ℔ lb.....
Foreign spelter, ℔ lb... . .....
Silesian, London, ℔ ton..... £
Sheet, American, ℔ lb .. ..
Sheet, foreign, ℔ lb.....

STOCK MARKET QUOTATIONS

Baltimore Stock Quotations.

Company.	Bid.	Asked.
Atlantic Coal	$1.50@$1.65	$1.65@$1.75
Balt. & N. C.	.37@.39	.40@.41
Big Vein Coal	....	....
Conrad Hill	.10@.15	.16@.25
Diamond Tunnel	.40@.45	..
George's Crk. C.	98.00@100.00	100@110
N. State, Balto.	.50	....
Ore Knob	.05@.10	.10@.12
Silver Valley	1.50@1.55	1 60

Highest and lowest prices bid and asked during the week ending November 24th.

Birmingham, Ala., Stock Quot.

Company.	Bid.	Asked.
Ala. Conn. C.	....	....
Bir. Min. & Mfg.	120 @135	....
Decat. L. Imp. & Fur.	25 @126	26 @ 27½
DecaturMin. L.	....	....
Enterprise Mfg	..	....
Sloss I. & S.	....	....
*Sloss I. & S.	....	82 @ 84
Sheffield C. & I.	70 @ 72½	72 @ 73½
WoodstockS&I	50	....

* Bonds. † Buyer 30 days.
Highest and lowest prices bid and asked.

Deadwood-Dak. Quotations.

Comp'y.	H.	L.	Comp'y.	H.	L.
Bullion	.05	.01½	Mugw'mp	....	....
C'nt'e Sh't	.03	.01	Poc'h'ntas	.01¼	.00¼
Cora	....	....	Rattler	.20	.10
Ent'rp'se	.03	.02	Ruby Bell	.05	.03
Eureka	.04	.02	Seabury	.12	.05
Hester A.	.06	.01½	Seg'eg'ted	.08	.03
Iron Hill	3.10	3.00	Silv'r Kid'e	.03	.01
Jefferson.	.15	.15	Sp'nish R.	.24	.12
Liberty	....	....	U.S.Gr'nt	....	....
Minna	.03	.01	West Va	.01¼	.01½
Mutual	.10	.08			

Highest and lowest prices bid and asked during the week ended November 19th.

Pittsburg Stock Quotations.

Company.	H.	L.	Closing.
Bridgewater Gas	100.00	100.00	100.00
Chartiers Val. Gas.	84.00	80.00	80.00
Columbia Oil Co.	....	....	....
Consignee Min. Co.	....	....	....
Forest Oil Co	90.00	80.00	80.00
Gogebic Iron Synd.	1.00	.10	.10
Hazlewood Oil Co.	....	....	....
Iron City Min. Co.	3.75	3.50	3.75
La Noria Mining	3.75	3.00	3.50
M'f'turers' Gas	....	....	....
Mansf'd C. & C. Co.	27.50	27.50	27.50
Nat. Gas Co., W. Va.	45 00	45 00	45.00
N. Y. & Cleve. Gas Coal	43.00	43.00	43.00
Ohio Valley Gas	40.00	40.00	40.00
Pennsylvania Gas.	25.50	25.50	25.50
People's Nat. Gas.	40.00	40.00	40 00
Philadelphia Gas.	48.50	47.25	47.50
Pine Run Gas Co.	....	....	....
Silverton Mining	....	....	....
South Side Gas	....	....	....
Tuna Oil Co	65.00	65.00	65.00
W't'h'se Air-Brake.	135.00	125.00	130.00
W't'ghouse Brake.	58.00	57.00	58.00
Westmoreland Cambria Gas	....	....	....
Wheeling Nat. Gas.	28.00	27.00	27.00
Yankee Girl Mining	6.50	6.5	6 50

Highest and lowest prices bid and asked during the week ending November 24th.

London Quotation.

Company.	Highest.	Lowest.
Alturas Gold, Idaho	14s. 6d.	13s. 6d.
Anglo-Montana, Mont.	6s.	4s.
Arizona Copper, Ariz.	£½	£⅜
Birdseye Creek, Cal.	8s.	6s.
California Gold, Colo.	8s. 6d	7s. 6d.
Carlisle, N. Mex	21s.	20s.
Centennial, Cal.	20s.	15s.
Charles Dickens, Id.	4s.	3s.
Colorado United, Colo.	£⅞	£⅝
Denver Gold, Colo.	2s. 6	2s.
Eberhardt, Nev.	5s.	4s.
Empire, Mont	£3	£2⅞
Flagstaff, Utah	6s	5s.
Garfield, Nev.	2s	2s.
Gold Hill, N. C.		2s.
Kohinoor, Colo.	£3 9-16	1s. 6d.
Montana Lt., Mont	8s.	£3 7-16
New California, Colo.	3s.	7s.
New Consolidated	5s.	2s.
New Emma, S., Utah	3s.	4s.
New Hoover Hill, N	3s.	2s.
New La Plata, Col.	£⅝	2s. 6d.
Plumas Eureka, Nev.	£⅞	£⅞
Richmond Con., Nev.	4s.	£4½
Ruby&Dunderb'g	2s. 6d.	3s.
Russell Gold, Cal.	£1	2s.
Sierra Butte	£1	£¾
Stanly, N. Colo.	7s.	£⅞
Union Gold, Colo.	£1	7s.
U. S. Plac., Idaho	20s.	£¾
Viola Lt., Idaho	18s. 9d.	18s. 9d.

Highest and lowest prices November 14th.

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and amount of last		Dividends. Total paid.	Dividends. Date and amount of last		
1	Adams, s. L.	Colo.	$1,500,000	150,000	$10	*			$555,000	Jan	1887	.15
2	Alice, s. C.	Mont	10,000,000	400,000	25				750,000	Sept	1886	.06¾
3	Alturas, G	Idah.	1,500,000	300,000	5				95,000	Sept	1886	.50
4	Amie Con., s. L.	Colo.	5,000,000	500,000	10	*			330,000	Oct.	1883	.05
5	Amy & Silveramita, s.	Mon.		341,419					247,530	Aug	1887	.12½
6	Atlantic, C.	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	360,000	Jan.	1887	1.00
7	Argenta, s	Nev..	10,000,000	100,000	100	295,000	July	1885	.10	40,000	Feb.	1880	.20
8	Aurora, i	Mich.	2,000,000	100,000	20					155,000	Oct.	1887	1.87½
9	Bassick, G. s.	Colo.	10,000,000	100,000	100	*				400,000	Mar.	1884	1.00
10	Belle Isle, s.	Nev..	10,000,000	100,000	100	160,000	Feb	1887	.20	300,000	Dec.	1879	.25
11	Belcher, G. s.	Nev..	10,400,000	104,000	100	2,269,335	Sept	1887	.50	15,387,000	Apl.	1876	1.00
12	Bellevue Idaho, s. L.	Idah.	1,250,000	125,000	10	26,250	Dec.	1883	10	200,000	Jan	1887	.10
13	Big B'nd Hydraulic, G	Dak..	1,000,000	200,000	5	*				25,000	Aug	1887	.03
14	Black Bear, G.	Cal..	3,000,000	30,000	100	22,500	Dec.	1884	.25	895,000	May	1883	.20
15	Bodie Con., G. s.	Cal..	10,000,000	100,000	100	424,990	Aug	1887	.50	1,602,572	Apl.	1885	.50
16	Bonanza Developm't	C & M	3,000,000	300,000	10					135,000	Oct.	1882	.15
17	Bonanza K'g, Cons. s.	Cal..	1,000,000	100,000	10	*				185,000	Feb.	1885	.10
18	Boston & Mont, G.	Mont	2,500,000	250,000	10	*				520,000	Jun	1886	.15
19	Breece, s.	Colo.	5,000,000	200,000	25	*				2,000	Feb.	1880	.01
20	Brooklyn Lead, L. s.	Utah	500,000	50,000	10					127,000	July	1887	.05
21	Bulwer, G.	Cal	10,000,000	100,000	10	60,000	July	1887	.20	175,000	Jan.	1884	.10
22	Caledonia, G.	Dak.	10,000,000	100,000	100	595,000	May	1885	.15	40,000	Feb.	1886	.10
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000				29,350,000	July	1887	5.00
24	Carbonate Hill, s. L.	Colo.	2,000,000	200,000	10	*				80,000	Apl.	1884	.05
25	Caribou Con., s.	Colo.	1,500,000	150,000	10	*				50,000	Mch	1880	.10
26	Castle Creek, G.	Idah.	100,000	100,000	1					51,000	Oct.	1883	.03
27	Catalpa, s. L.	Colo.	3,000,000	300,000	10	*				270,000	May.	1884	.10
28	Central, C.	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,820,000	Feb.	1887	2.00
29	Christy, s.	Utah	10,000,000	100,000	100					10,000	Jun.	1885	.10
30	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec.	1884	.25
31	Colorado Central, s. L	Colo.	2,750,000	275,000	10	*				241,375	Nov.	1887	.05
32	Cons. Cal. & Va., G. s	Nev..	21,600,000	216,000	100	108,000	Jan.	1885	.20	1,144,000	Oct	1887	.50
33	Con. Gold Mining, G.	Ga...	500,000	100,000	5	*				108,000	Nov.	1883	.02
34	Contention, s	Ariz.	12,500,000	250,000	50					†2,587,000	Dec.	1884	.25
35	Crescent, s. L. G.	Utah	15,000,000	600,000	25	‡				210,000	Aug.	1886	.05
36	Crown Point, G. s.	Nev..	10,000,000	100,000	100	2,675,000	Feb.	1882	.25	11,588,000	Jan.	1875	2.00
37	Daly, s. L.	Utah	3,000,000	150,000	20					375,000	Nov.	1887	.50
38	Deadwood-Terra, G.	Dak..	5,000,000	200,000	25	*				11,000,000	Nov.	1887	.10
39	Derbec H. Grav., G. s.	Cal..	10,000,000	100,000	100	90,000	Dec.	1881	.10	180,000	May	1887	.10
40	Dunkin, s. L.	Colo.	5,000,000	200 000	25	*				250,000	Oct	1887	.10
41	Elkhorn, G. s.	Mont	1,000,000	100,000	10	50,000	July	1883	.50	180,000	July	1887	.05
42	Empire Lt., G.	Mont	500,000	100,000	5					33,000	Mar	1887	.05
43	Eureka Con., G. s. L.	Nev..	5,000,000	50,000	100	500,000	July	1886	1.00	4,868,000	Dec	1887	.25
44	Evening Star, s. L.	Colo.	500,000	50,000	10	*				1,400,000	Nov	1883	.50
45	Excelsior, G.	Cal..	10,000,000	100,000	100	560,000	Sept	1885	1.00	875,000	Oct.	1880	.25
46	Father de Smet, G.	Dak..	10,000,000	100 000	100	200,000	Nov	1878	1.00	1,125,000	Dec.	1885	.20
47	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun.	1871		560,000	Dec	1886	1.00
48	Freeland, G. s. C.	Colo.	5,000,000	300,000	25	*				190,000	Dec	1886	.10
49	Fresno Enterprise, G	Cal..	5,000,000	100,000	50			Mch	1883	110,000	July	1882	.10
50	Garfield Lt., G. s.	Nev.	500,000	100,000	5					25,000	Mar.	1885	.12½
51	Gould & Curry, G. s.	Nev.	10,800,000	108,000	100	4,213,400	Nov.	1887	.50	3,826,000	Oct.	1879	10.00
52	Grand Central, s.	Ariz.	1,000,000	100,000	10					625,000	Dec.	1882	.25
53	Grand Prize, s.	Nev.	10,000,000	100,000	100	570,000	Apl.	1886	.50	495,000	Mar.	1884	.25
54	Granite, s.	Colo.	125,000	125,000	1					6,250	May	1883	.01
55	Granite Mountain, s.	Mont	10,000,000	400,000	25					3,400,000	Nov.	1887	.50
56	Green Mountain, G.	Cal..	1,250,000	125,000	10					212,000	Nov.	1881	.07½
57	Hale & Norcross, G. s	Nev..	11,200,000	112,000	100	5,086,800	July	1887	.50	1,598,000	Apl.	1871	5.00
58	Hall-Anderson, G.	N.S.	150,000	150,000	1					7,000	Jan.	1882	.05
59	Hecla Con., s. G. L. C.	Mont	1,500,000	30,000	50					1,047,000	Aug	1886	.50
60	Hel'a Mg & Red, G. s. L	Mont	3,315,000	663,000	5	*				197,970	July	1886	.06
61	Holmes, s.	Nev..	10,000,000	100,000	100	300,000	Sept	1885	10	75,000	Apl.	1886	.25
62	Holyoke, G.	Idah.	200,000	200,000	1					27,000	Feb.	1883	.10
63	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July	1878	1.00	3,968,750	Nov	1887	.20
64	Honorine, s. L.	Utah	500,000	2 50,000	2	25,000	Jun.	1883		125,000	Sept	1887	.05
65	Hope, s.	Mont	1,000,000	100,000	10	*				183,252	Oct.	1887	.25
66	Horn-Silver, s. L.	Utah	10,000,000	400,000	25	*				4,000,000	Nov.	1884	.50
67	Idaho, G.	Cal..	310,000	3,100	100					4,539,500	Apl.	1887	5.00
68	Ideal, s. L.	Colo.	1,500,000	50,000	10					15,000	Oct.	1886	.05
69	Illinois, s.	N.M.	100,000	100,000	1	*				25,000	Jan	1887	.25
70	Independence, s.	Nev..	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept	1879	.25
71	Indian Queen, s.	Nev..	250,000	125,000	2					368,750	July	1883	.03
72	Invo, G.	Cal..	500,000	100,000	5	*				45,000	Apl.	1882	.05
73	Iron Hill, s.	Dak.	2,500,000	250,000	10	82,500	Oct.	1885		156,250	Nov.	1887	.07½
74	Iron-Silver, s. L.	Colo.	10,000,000	500,000	20	*				2,100,000	Oct.	1887	.20
75	Jackson, G. s.	Nev.	5,000,000	50,000	100	10,000	Nov	1880	.20	45,000	Oct.	1886	.10
76	Jocalsitla, s.	Mex.	2,500,000	250,000	10					1,200,000	Feb.	1885	.50
77	Jumbo, G.	Colo.	2,000,000	200,000	10					15,000	Jun.	1887	.02½
78	Kentuck	Nev..	3,000,000	30,000	100	342,000	Nov	1881	.30	1,600,000	Dec.	1886	.10
79	La Plata, s. L.	Colo.	2,000,000	200,000	10	*				610,000	Sept	1882	.30
80	Leadville Cons., s. L.	Colo.	4,000,000	400,000	10	*				430,000	Apl.	1887	.05
81	Lexington, G. s.	Mont	4,000,000	40,000	100	*				565,000	Jan.	1885	2.00
82	Little Chief, s. L.	Colo.	10,000,000	200,000	50	*				780,000	Mch	1885	.10
83	Little Pittsburg, s. L	Colo.	20,000,000	200,000	100	*				1,050,000	Mch.	1880	50
84	Manhattan, s.	Nev	5,000,000	50,000	100	300,000	Jun	1887	1.00	437,500	Feb	1886	.25
85	Marguerite, G.	Cal..	500,000	25,000	20					18,750	Oct.	1882	.25
86	Marion Bullion, G	N.C.	500,000							15,000	Jan.	1886	
87	Martin White, s.	Nev..	10,000,000	100,000	100	1,150,000	Mar.	1886	25	140,000	Dec.	1886	.25
88	Mary Murphy, G. s.	Colo.	350,000	3,500	100	*				87,500	Sept	1887	5.00
89	Minnesota, C.	Mich	1,000,000	40,000	25	420,000	Apl.	1886	1 00	1,820,000	Mar.	1876	
0	Mono, G.	Colo.	5,000,000	50,000	100	610,000	Sept	1887	.50	12,500	Mar.	1887	.25
1	Montana, Lt., G. s.	Mont	3,300,000	660,000	5	*				1,247,400	July	1887	.75
2	Morning Star, s. L.	Colo.	1,000,000	100,000	10					750,000	Nov.	1887	.25
3	Moulton, s. G.	Mont	2,000,000	400,000	5	*				350,000	May	1887	.07½
4	Mount Pleasant, G.	Cal.	150,000	150,000	1	*				150,000	Feb.	1887	.30
5	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	Jun.	1880	2.00	80,000	July	1885	.20
6	Napa, Q	Cal..	700,000	100,000	7					290,000	Jan.	1881	.10
7	Navajo, G. s.	Nev..	10,000,000	100,000	100	450,000	Mar.	1887	30	325,000	Feb.	1885	.25
8	N. Hoover Hill, G. s.	N. C.	300,000	120,000	2½	*				30,000	Dec.	1885	.06½
9	New York Hill, G.	Cal..	5,000,000	50,000	100	62,500	Oct.	1885	.15	215,000	Aug.	1882	.10
0	Northen Belle, s.	Nev..	5,000,000	100,000	100	425,000	Jan.	1884	8.00	2,400,000	Apl.	1883	50
1	North Bile Isle, s.	Nev..	10,000,000	100,000	100	250,000	Mar.	1887	.50	30,000	Aug.	1881	.15
2	Ontarios, L.	Utah	15,000,000	150,000	100					8,75 ,000	Nov.	1887	.50
3	Ophir, Gs.	Nev..	10,000,000	100,000	100	4,057,800	Aug	1887	.50	1,595,000	July	1882	1.00
4	Origina s. C.	Mont	1,500,000	60,000	25	*				126,000	Oct.	1887	.05
5	Osceola C.	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	1,022,500	Jan.	1887	1.00
6	Oxford G.	N. S.	125,000	125,000	1	*				34,500	Oct.	1885	.02
7	Paradis Valley, G. s	Nev.	10,000,000	100,000	100	47,000	Mar.	1882	.15	150,000	Apl.	1887	.10
8	Parrott	Mont	1,800,000	180,000	10					54,000	Oct.	1887	.10
9	Peacoc, s. G. C.	N.M.	2,000,000	200,000	10	*				60,000	Nov.	1886	
0	Pleasai Valley, G. s.	Cal..	10,000,000	100,000	100	10,000	Mar.	1881	.10	30,000	Dec.	1882	.05
1	Plutus, s. C. L.	Colo.	2,000,000	200,000	10	*				20,000	Feb.	1886	.10
2	Plymoth Con., G.	Cal..	5,000,000	100,000	50	*				2,200,000	Dec.	1887	.40
3	Prussia, s. L.	Colo.	1,500,000	150,000	10					132,000	Jan	1883	.10
4	Quicksiver, pref., Q.	Cal..	4,300,000	43,000	100					914,150	Aug.	1887	1.50
115	com., Q.	Cal..	5,700,000	57,000	100					151,000	July	1882	.40
116	Quine, C.	Mich	1,000,000	40,000	25	200,000	Dec.	1862		4,610,000	Aug.	1887	1.00
117	Richmond, s. L.	Nev..	1,350,000	54,000	25	*				4,312,587	Jun.	1887	1.25
118	Ridge	Mich.	500,000	20,000	25	220,000	Mar	1886	.50	100,000	Feb.	1880	.50
119	Risinsun, s.	Dak..	750,000	150,000	5	*				52,000	May	1881	.07½
120	Robinson Con., s. L.	Colo.	10,000,000	200,000	50	*				585,000	Mar.	1886	.05
121	Robert E. Lee, s. L.	Colo	10,000,000	500,000	20					100,000	Dec.	1882	.50
122	Rooks	Vt.	500,000	50,000	10	*				61,000	Apr	1885	.30
123	Savage	Nev..	11,200,000	112,000	100	6,324,000	Sept	1887	50	4,460,000	July	1869	3.00
124	Secur L. Mg., Mfg.	Colo.	1,000,000	100,000	10	*				50,000	July	1884	
125	Shoshe, G.	Idah.	150,000	150,000	1					7,500	Apl.	1883	.01
126	Sierra ittes, G.	Cal..	225,000	22,500	10					1,477,245	Oct.	1887	.31¼
127	Sierra ande, s.	N. M.	2,500,000	500,000	5					860,000	Sept	1884	.25
128	Sierra vada, G. s.	Nev..	10,000,000	100,000	100	6,262,000	Aug.	1887	.25	102,000	Jan.	1871	1.00
129	Silver Ki, G. s. L.	Colo.	5,000,000	500,000	10					225,000	Nov.	1883	.25
130	Silver Kl, G. s. L.	Colo.	5,000,000	500,000	10					2,000,000	July	1887	.25
131	Silverton s.	Ariz.	10,000,000	100,000	100					76,000	Nov.	1886	.02
132	Small Ho, s. L.	Colo.	2,000,000	200,000	10	*				3,062,500	Nov.	1887	.20
133	Smuggler, Cons., s.	Colo.	5,000,000	250,000	20	*				66,700	Aug.	1883	.25
134	Socorro, C.	N. M.	250,000	25,000	100					4,000	Mch	1882	.00¼
135	South Yuba	Cal..	2,000,000	20,000	50	*				150,000	Oct.	1881	.75
136	Spring Valle,	Cal..	200,000	200,000	1	50,000	Oct.	1886	.25	50,000	Jan.	1881	.25
137	Standard, G.	Cal..	10 000,000	100,000	100	25,000	Oct.	1884	.25	3,535,000	Nov.	1887	.05
138	Stormont, s.	Utah	500,000	500,000	1	*				153,000	Nov.	1881	.05
139	St. Joseph, L.	Mo..	1,500,000	150,000	10	*				814,000	Sept	1887	.20
140	Surinam, G.	D. G.	3,000,000	600,000	5					105,000	Nov.	1887	.05
141	Syndicate, G.	Cal..	10,000,000	100,000	100	38,729	July	1882	.15	48,308	Sept	1885	.10
142	Top Top, s.	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	100,000	Nov.	1881	.20
143	Tombstone, G. s.	riz.	12,500,000	500,000	25	*				1,250,000	Apl.	1882	.10
144	United Verde, C.	riz.	3,000,000	300,000	10	*				97,500	Feb.	1884	.20
145	Valencia, M.	Az.	150,000	1,500	100	*				37,500	Apl	1886	2.50
146	Viola Lt., s. L.	ri.	750,000	150,000	5	*				74,500	May	1887	.12½
147	Vizina, s.	riz	5,000,000	200,000	25	*				140,000	Apl.	1882	.10
148	Yankee Girl	Co.	2,500,000	250,000	10					1,087,500	July	1887	.10
149	Yellow Jacket, G. s.		2,000,000	120,000	100	5,448,000	Dec	1885	.75	2,184,000	Aug.	1871	1.50

G. Gold. S. Silver. L. L... vidually paid $275,000 in elev... C... Previous to the consolli... ...vided, and the Terra $75,000. Previous to the consolidation in Aug., 1884, the California had paid $31,320,000 in dividends, and the Con. Virginia $42,393,000... ...pper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid $1,400,000. Non assessable for three years. ‡ The Deadwood pre... ...of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid $1,350,000 in dividends.

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par Value.	Assessments. Total levied.	Assessments. Date & am'nt of last.		
1	Agassiz Cons., s. L.	Colo.	$2,500,000	50,000	$50	*			
2	Albion, s. L.	Nev..	15,000,000	150,000	100	$577,000	July	1883	.25
3	Allouez, C.	Mich	2,000,000	80,000	25	240,000	Feb	1884	
4	Alpha Con., G. s.	Nev..	3,000,000	30,000	100	460,000	Aug.	1887	.50
5	Alta, s.	Nev..	10,080,000	100,800	100	2,027,000	Feb	1887	.50
6	Amador, G.	Cal..	400,000	200,000	2	*			
7	American Flag, s.	Colo.	1,250,000	125,000	10	300,000	Jun	1877	.50
8	Anglo-Montana, Lt.	Mon.	600,000	120,000	5				
9	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5				
10	Aspen Mg. & S., s. L	Colo.	2,000,000	200,000	10				
11	Barcelona, G.	Nev..	5,000,000	200,000	25	*			
12	Bechtel Con., G.	Cal..	10,000,000	100,000	100	173,500	Jan.	1883	.10
13	Belmont, s.	Nev..	5,000,000	50,000	100	735,000	Apl.	1886	.10
14	Best & Belcher, G. s.	Nev..	10,080,000	100,800	100	1,900,520	Aug.	1887	.50
15	Big Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*			
16	Bi-Metallic, s.	Mon.	5,000,000	200,000	25	*			
17	Black Jack, G.	Cal..	250,000	100,000	2½				
18	Boston Con., G.	Cal..	13,000,000	100,000	100	170,000	Nov	1883	.25
19	Bradshaw, s.	Ariz.	2,250,000	225,000	10	*			
20	Brunswick, G.	Cal..	2,000 000	400,000	5				
21	Bullion, G. s.	Nev..	10,000,000	100,000	100	5,050,000	Aug	1887	.50
22	Bve and Bye	Ariz.	1,000,000	100,000	10	*			
23	Calaveras, G.	Cal..	500,000	500,000	1	*			
24	Carisa, G.	Wy.	500,000	100,000	5	*			
25	Cashier, G. s.	Colo.	500,000	250,000	2	*			
26	Cen Contin'l, G. s. L.	C. & A	2,000,000	200,000	10	*			
27	Charles Dickens, G. s.	Idah.	1,250,000	250,000	5	*			
28	Cherokee, G.	Cal..	1,500,000	150,000	10				
29	Chollar, s.	Nev..	11,200,000	112,000	100	1,152,000	Aug.	1887	.50
30	Cinnamon Mt., G. s.	Colo.	750,000	150,000	5				
31	Climax, s. L.	Colo.	2,000,000	200,000	10	*			
32	Colorado No. 2, s. L	Colo.	100,000	10,000	10				
33	Comstock, G. s.	Nev..	10,000,000	100,000	100	30,000	Mar.	1887	.15
34	Con. Imperial, G. s.	Nev..	5,000,000	50,000	100	1,175,000	Sept	1887	.25
35	Con. Pacific, G.	Cal..	6,000 000	60,000	100	183,000	Sept	1887	15
36	Cons Silver, s.	Mo..	2,500,000	250,000	10				
37	**Cop. Queen Cons, C.	Ariz	1,400 00	140.000	10				
38	Courtlandt	Colo.	500,000	50,000	10				
39	Crescent, s. L.	Colo.	3,000,000	300,000	10	*			
40	Crocker, s.	Ariz.	10,000,000	100,000	100	75,000	May	1887	.10
41	Crowell, G.	N. C.	500,000	500,000	1				
42	Dahlonega, G.	Ga...	250,000	250,000	1	*			
43	Dandy, s.	Colo.	5,000,000	500,000	10				
44	Dardanelles, G.	Cal..	1,000,000	100,000	10				
45	Decatur, s.	Colo.	1,500,000	300,000	5	*			
46	Denver City, s. L.	Colo.	5,000,000	500,000	10	*			
47	Denver Gold	Colo.	300,000	60,000	5				
48	Deseret, G. s.	Utah	500,000	50,000	10	*			
49	Donderberg, s.	Colo.	1,500,000	150,000	10	*			
50	Durango, G.	Colo.	500,000	500,000	1	*			
51	Eastern Dev. Co., Lt.	N. S.	1,500,000	150 000	10	990,000	Mar.	1886	1.00
52	El Cristo, G. s.	U.S.C	1,000,000	500,000	2	*			
53	El Dorado, G.	Cal.	1,000,000	250,000	4				
54	El Talento, G.	U.S.C	1,000,000	500,000	2				
55	Empire, s.	Utah	10,000,000	100,000	100	*			
56	Enterprise, s. L.	Colo.	800,000	80,000	10	*			
57	Eureka Tunnel, s. L.	Nev..	10,000,000	100,000	100	*			
58	Exchequer	Nev..	10,000,000	100,000	100	880,000	July	1887	.20
59	Found Treasure, G. s.	Nev..	10,000,000	100,000	100	6,000	Nov.	1887	.06
60	Gold Cup, s.	Colo.	500,000	500,000	1	*			
61	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.25
62	Gold Rock, G.	Cal.	1,000,000	500,000	2	*			
63	Goodshaw, G.	Cal..	10,000,000	100,000	100	*			
64	Grand Belt, C.	Tex.	12,000,000	120,000	100				
65	Grand Duke	Colo.	800,000	80,000	10				
66	Great Remance, G.	U.S.C	1,000,000	500,000	2	*			
67	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*			
68	Gregory Con., G.	Mon.	3,000,000	300,000	10				
69	Harlem M. & M. Co, G.	Cal..	1,000,000	200,000	5				
70	Head Cent. & Tr. s. G	Ariz.	10,000,000	100,000	100				
71	Hector, G.	Cal..	1,500,000	300,000	5				
72	Highland, C.	Mich	500,000	25,000	25				
73	Hortense, s.	Colo.	2,000,000	200,000	10				
74	Huron, C.	Mich	1,000,000	40,000	25	280,000	May	1887	3 00
75	Iron Gold & Silver, s	N. M.	2,000,000	200,000	10				
76	Iroquois, G.	Mich	1,250,000	50,000	25				
77	J. D. Reymert	Ariz	10,000,000	100,000	100	*			
78	Julia Cons., G. s.	Nev..	11,000,000	110,000	100	1,452,000	Apl.	1887	.10
79	Kearsarge, C.	Mich	1 250,000	50,000	25	150,000	Oct.	1887	1.00
80	Laciede	N. M	2,000,000	200,000	10				
81	Lacrosse, G.	Colo.	1 000,000	100,000	10	*			
82	Lee Basin, s. L.	Colo.	5,000,000	500,000	10	*			
83	Lucerne, s.	Colo.	5,000,000	500,000	10	*			
84	Mammoth Bar., G.	Cal..	10,000,000	100,000	100	50,000	Dec.	1881	
85	Mariposa pref., G.	Cal..	5,000,000	50,000	100	1,687,500	Feb.	1883	.25
86	common, G.	Cal..	10,000,000	100,000	100	1,975,000	Dec.	1881	.20
87	May Belle, G.	Cal..	10,000,000	100,000	100	84,000	Mar.	1884	.15
88	Mayflower Gravel..	Cal..	1,000,000	100,000	10	235,000	Sept	1887	.25
89	Medora, G.	Dak.	250,000	250,000	1				
90	Mexican, s. s	Nev..	10,000,000	100,000	100	2,615,960	July	1887	.25
91	Middle Bar G.	Cal.	400,000	200,000	2	*			
92	Mike & Starr, s. L.	Colo	1,000,000	200,000	5	*			
93	Monitor, G.	Colo.	100,000	100,000	1	*			
94	Moose Silver, s.	Colo.	3,000,000	300,000	10	*			
95	Nachoochee, Lt., G.	Ga..	1,000,000	200,000	5				
96	Neath, G.	Colo.	1,000,000	100,000	10				
97	Nevada Queen, s.	Nev.	10,000,000	100,000	100	80,000	Mar	1887	.50
98	New Germany, G.	N. S.	100,000	100,000	1	*			
99	New Pittsburg, s. L.	Colo.	2,000,000	200,000	10	*			
100	North Standard, G.	Cal..	10,000,000	100,000	100	20,000	Nov		
101	Noonday	Cal.	600,000	60,000	10	208,000	Dec.	1881	.10
102	Oneida Chief, G.	Cal.	500,000	125,000	4	*			
103	Oriental	Nev..	2,000,000	200,000	10				
104	Oriental & Miller, s.	Nev..	10,000,000	400,000	25	*	Aug	1887	.25
105	Osceola, G.	Nev..	5,000,000	50,000	100				
106	Overman, G. s.	Nev..	11,520,000	115,200	100	3,765,680			
107	Park, s.	Utah	2,000,000	200,000	10				
108	Peer, s.	Ariz.	10,000,000	100,000	100	135,000	Nov.	1886	.10
109	Peerless, s.	Ariz.	10,000,000	100,000	100	320,000	Sept	1887	.25

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Nov. 19.		Nov. 21.		Nov. 22.		Nov. 23.		Nov. 24.		Nov. 25.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon													
rgenta, Nev													
Bassick, Colo													
Belcher, Nev					11.37		10.63						200
Belle Isle, Nev													
Bodie Cons., Cal	2.65				3.10	2.90	3.35	3.05			3.25	3.00	3,530
Breece, Colo													
Bulwer, Cal	1.15				1.00								200
Caledonia, Dak													
Chollar, Nev													
Chrysolite, Colo													
Colorado Cent'l, Colo													
Cons. Cal. & Va., Nev	23.50		26.25		28.88	25.25					24.75		525
Crown Point, Nev					10.75		10.13						200
Deadwood, Dak					2.66		2 60	2.50					400
Dunkin, Colo	.85				.87								400
Eureka Cons., Nev													
Father de Smet, Dak							.40						10
Freeland, Colo													
Gold Stripe, Cal													
Gould & Curry, Nev													
Green Mountain, Cal													
Hale & Norcross, Nev					5.38								100
Helena, Mont													
Holyoke, Idaho	.10	.09			.10						.07		1,500
Homestake, Dak			13.00	ex.d.							13.00		125
Horn-Silver, Ut	.85		.82	.80									4 00
Independence, Nev													
Iron Hill, Dak													
Iron Silver, Colo					2.80		2.80						200
Leadville C., Colo			.30										50
Little Chief, Colo					.29	.26	.26				.25		1,300
Little Pittsburg, Colo	.33				.33								600
Martin White, Nev													
Mono, Cal	2.40				2 35		2.50	2.45			2.35	2.30	1,400
Mount Diablo, Nev							4 50						100
Navajo, Nev							1.00						100
North Belle Isle, Nev													
Ontario, Ut					27.00		27.00	26.25					182
Ophir, Nev	12.88												100
Plymouth, Cal													
Quicksilver Pref., Cal							29 00	28.50			29 25		400
" Com., Cal			6.50	6 00			6.50	6 00			6.75	6.50	2,900
Robinson Cons., Colo													
Savage, Nev			9.50								9.13		300
Sierra Nevada, Nev			6.75		7.75								100
Silver King, Ariz							4.75	4.50					240
Standard, Cal	2.00	1.95	2.00	1.90	2.20	2.00	2.55	2.25			2.55	2.35	5,750
Stormont, Ut			.05										400
Surinam, D. G													
Yellow Jacket, Nev	6.88						7.25						200

NON-DIVIDEND-PAYING MINES.

Name and Location of Company.	Nov. 19.		Nov. 21.		Nov 22.		Nov. 23.		Nov. 24.		Nov. 25.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Amador, Cal	1.35		1.35		1.35		1.35				1.40	1.35	2,000
Am. Flag, Colo													
Barcelona, Nev			.50		.50	.47	.50						920
Bechtel Con., Nev													
Best & B'licher, Nev													
Big Pittsb'g, Colo													
Brunswick	1.60		1.60	1.55	1.60		1 60				1.60		2,200
Bullion, Nev	3.70												100
Cashier	.50		.50	.48	.50						.50		1,800
Castle Creek, Id	.12	.11	.13	.10	.13	.12							8,800
Central Ariz., Ariz													
Columbia & Beaver													
Con. Imperial	2.30				3.35						3.15		1,800
Con. Pacific													
Decatur													
Eastern Oregon	.02		2.80		3.00	2.60	2.75				2.75		1,300
El Cristo, U. S. Col	2.80												710
Exchequer	2 15		2 55		2.10		2.20				2.20		600
Found Treasure													
Hector													
Julia, Nev	.60		.80		.85		.75				.80		870
Kossuth													
Lacrosse, Colo					.13	.12							3,000
Mexican, Nev	7.25		7.88				6.50				6.88	6.63	500
Middle Bar, Cal	.41	.40	.39	.37	.36	.35	.35				.35		6,000
Monitor	.17	.16					.16	.15					1,600
New Pittsb'g, Colo													
North Stand'd, Cal			.12										400
N. Horn-Silv'r, Ut													
Oneida Chief													
Ori'nt'l&Mil'r, Nev													
Phœnix of Arkan's													
Phœnix of Arizona													
Potosi							8.18						150
Rappahann'k, Va	.22		.22		.22		.23	.21			.22	.21	3,100
Red Elephant, Colo							.01						500
Renfrew, N. S													
Saint Kevin, Colo													
San Sebastian	3.55	3 50	3.50		3.50						3.50	3.00	550
Santiago, U. S. Col													
Security, Colo	1.65	1.50	2.00	1.38	1.50	1.45	1.88	1.50			1.75	1.50	4,900
Silver Cliff, Colo													
Silver Hill					.60								200
Silver Queen, Ariz													
Stanislaus, Cal													
State L'e, 1&4, Nev													
" Nos. 2 & 3, Nev													
Sutro Tunnel, Nev	.36	.34	.34	.27	.32	.29	.31	.27			.30	.27	78,23 0
Taylor Plumas, Cal					.03		.04	.03			.03		4,900 0
Tornado	1 10												1,000 0
Union Cons., Nev			5.38		5.00								25 0
Utah	2.50												100

*Dealt in at the New York Stock Exchange. Unlisted Securities.

BOSTON MINING STOCK QUOTATIONS.

Name of Company.	Nov. 18.		Nov. 19.		Nov. 21.		Nov. 22.		Nov. 23.		Nov. 24.		Sales.
Atlantic, Mich					11.50	11 00	11.75		12.00	11.75			985
Bodie, Cal													
Bonanza D	1.13	1.06	1.13	1.06	1.19		1.13		1.13				1,500
Boston & Mont., Mont													
Breece, Colo			.40				38						300
Calumet & Hecla, Mich	204		204		192	185	192	185	193½	193			206
Catalpa, Colo			.26		.26		.26	.25	.27½	25			2,145
Chrysolite, Colo													
Con. Virginia, Nev													
Dunkin, Colo	.92½	.90	.97½		.97½				1.00	95			2,700
Enterprise													
Eureka, Nev													
Franklin, Mich	12.88	12.63	12.75		13.00	12.75	13.25	12.88	14.75	13.50			3,360
Freeland, Colo													
Green. Mo													
Honorine, Utah													
Ironton Iron Co., Mich													
Kearsarge					5.00				5.00				300
Little Chief													
Napa, Cal													
Osceola, Mich	18.75	18.50	19.00		19.00		19.00	18.75	21.25	19.25			758
Pewabic, Mich													
Quincy, Mich			54.00	52.00	55.00	54 50	56.00	55.00	56 50	55.00			424
Robinson, Colo													
Sierra, Nev													
Silver King, Ariz													
Stormont, Utah	.05		.05										700

Name of Company.	Nov. 18.	Nov. 19.	Nov. 21.	Nov. 22.	Nov. 23.	Nov. 24.	Sales
Allouez, Mich		1.00	1.00	1.00	1.10		775
Arnold, Mich			.40		.45		700
Aztec		.09	.10	.10			800
Blue Ridge, Mich							
Bijou							
Bowman Silv'r, Nev			.04				1,0 0
Brunswi'k	1.60	1.60		1.60	1.60		900
Cashier, Colo							
Contentment							
Con. Pacific, Cal							
Crescent, Colo				.09			200
Cusi, N. Mex	.20		.20		.19		800
Decatur, Colo							
Empire							
Gogebic							
Huron, Mich	3.75						100
Kossuth							
Mesnard	.30			.32½			300
National, Mich							
Oriental & M., Nev							
Rappahannock, Va	.22	.22	.22	.22			2,100
Security, Colo	1.50	1.50	1.75	1.50	1.50		500
South Side			.28	.30	.30		3 0
Sutro Tunnel, Nev	.38	.36 35	.34	.30	.30		1,9 0
Tamarack		102 100	100	100	100		1,240
Taylor Plumas, Cal	.04						3,0 6
Washington	20	.20	.23		.20		2,0 0

New York: Dividend shares sold, 21,912. Non-dividend shares sold, 126,480. Total New York, 148,392.
Boston: Dividend shares sold, 13,378. Non-dividend shares sold, 16,621. Total Boston, 29,999.

COAL STOCKS.

Name of Company.	Par value of shares.	Nov. 19.		Nov. 21.		Nov. 22.		Nov. 23.		Nov. 24.		Nov. 25.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Barclay Coal														
Cameron Coal	100													
Ches. & O. RR	100	3¼		3¼								4	3½	260
*Chic. & Ind. Coal RR	100													
Do. pref	100							90						50
Col. & Hocking Coal	100	33	31⅞	33⅞	32⅝	33⅝	32	32⅝	32			33⅛	32	28,860
Col., C. & I	100	39	37½	40½	38¼	40½	38½	39⅜	38⅜			40	38¾	12,560
Consol. Coal	100													
Cumb. C. & I	100													
Del. & H. C	100	104⅜	104	105	104½	104⅜	104	104¾				106½	104¾	14,747
D., L. & W. RR	50	133⅞	133½	135	133⅞	134⅜	133⅝	134⅜	133¼			134½	133¾	92,575
Elk Lick Coal Co														
Hocking Valley	100	26½				26½	26¼	26				26		525
Lehigh C. & N.†	50	47		47¼	46⅞	48	47½	48⅛	47⅜					846
Lehigh Valley RR.†	50	54¾		54½		55	54½	54⅝	54½					244
L. & W. C. & I. Co														
Marshall Con. Coal	100													
Maryland Coal	100	15												100
Montauk Coal	100													
Morris & Essex	50													
New Central Coal	100	15												100
N. J. C. RR	100	79½	79¼	79¼	78½	79⅛	78					78½	77⅝	9,324
N. Y. & S. Coal	50													
N. Y., Susq. & Western	100	10	9⅝	9⅞	9¾	9⅜		10	9¾			9⅝		825
Do. pref	100	32¼	32	32¼	31⅓	32	31½	31½				32	31½	1,340
N. Y. & Perry C. & I	100													
Norfolk & Western R R	100			16		17	16	16¼	16					923
Do. pref	100	43	42¾	43⅛	42½	43⅜	42½	43½	42¾			43¼	43	6,161
Penn. Coal	50													
Penn. RR.†	50	55⅝	55½	55½	55	55⅛	55¼	55⅜	55⅛					2,179
Ph. & R. RR.**	50	71¼	70½	71⅜	70½	71⅝	70½	71⅜	70⅜			71⅜	70¾	267,883
Spring Mountain	50													
Tennessee C. & I. Co	100	30¾	30⅛	31¼	30	31¼	30⅞	30⅝	30			30⅞	30¼	10,000
Westmoreland Coal†	50													

** Of the sales of this stock, 47,653 were in Philadelphia, and 220,230 in New York.
† The quotations for these stocks are not percentage, but actual price.
Dealt in at the New York Stock Exchange Unlisted Securities.

Total sales, 449,502.

San Francisco Mining Stock Quotations.

Company.	Closing Quotations. Nov. 18.	Nov. 19.	Nov. 21.	Nov. 22.	Nov. 23.	Nov. 24.†	Nov. 25.*
Alpha							
Alta	3	3.20	3.20	3.05	3.15		
Argenta							
Belcher							
Belle Isle	.60	.70	.65	.65			
Best & Bel	8½	9	9⅝	9½	8⅝		
Bodie	2 55	2½	3	3.15	3		
Bulwer	1	1	1	1.10	1.10		
Chollar	6⅜	6¾	7½	7	6⅝		
Com'nwith	2¼	2.35	2½	2½	2.30		
Con. C. & V.	24	26	26	25¼	24½		
Con. Pac					20		
Crown Pt	9⅜	9	11⅛	10¼	10¾		
Eureka C	6¾	6¾	6¾	6⅝	6⅝		
Gould & C	4.90	5¼	5¾	5½	5¼		
Hale & N	4 80	5⅛	5⅜	5¼	5⅛		
M. White							
Mexican	6⅞	6⅞	7½	6⅞	6⅝		
Mono	2¼		2.15	2.40	2.30		
Mt. Diablo	4½			4½			
Navajo	.95	.85	.95	.95			
Nev. Queen	3.40	3.35	3¼	3 40	3 40		
N. Belle I	8	8	8⅛	8¼	8		
Ophir	13⅜	13⅝	13¾	12⅝	11⅜		
Potosi	7	7¼	9	8⅝	7¾		
Savage	8½	9⅛	9⅝	9¼	8¾		
Scorpion							
Sierra Nev	6¾	7⅛	7½	7	6⅝		
Sutro Tun							
Tip Top							
Union Con	4.60	4.95	5	4.80	4.60		
Utah	2 35	2.45	2.45	2 45	2.40		
Yellow Jkt	6⅝	6½	7¼	7	6⅝		

† Thanksgiving.
* No quotations.

in any direction. Steel rails are selling in small lots at $33@$33.50. Large orders are still withheld, and it is impossible to get a single expression of opinion from those who know whatever is known about trade prospects. Very few lots of old rails have been sold this week. The market is dull. For prices we refer to our weekly register of current quotations.

Pittsburg. Nov. 24.

[From our Special Correspondent.]

We have nothing of special importance to note in regard to raw irons. dealers being apart in their views. The result was a dull market and limited transactions. There is an utter lack of push or vim in trade generally, which tends to induce feelings of distrust and doubt, without, perhaps, any substantial reason for it. There are certain furnaces that have sold up to the first of the year, and others who are unwilling to accept present figures. Many persons are of the opinion that there will be but little change in the market, before the first of January, as the holidays always have the effect to curtail business. Just what direction the market will take after the holidays, will be for the future to decide. The conservative feeling noted in our last continues. Large buyers were conspicuous by their absence, while small buyers were less numerous than for some weeks past. This situation can't hold out much longer at the present rate of consumption; raw material must be had. In conversation with a well informed gentleman who had just returned from the Mahoning Valley, he remarked, there is very little metal at the furnaces, in fact they may be termed bare, with many of them working on previous contracts that will keep them employed the balance of the year. The sales reported were small and show a wide range of prices, the heaviest shading being on outside lots. The demand for Foundry is increasing, whilst Gray Forge seemed to be neglected. Bessemer weaker and could be purchased below last week's prices. The demand for mottled and white is improving. Old Rails are dull, with scarcely any buyers. Muck Bar is not quoted lower. Billets are without change. Scrap material is very dull, having no fixed value.

The everlasting coke question is still unsettled; the general opinion is there will be no strike. The men seem to have no desire for a movement of that kind. The scarcity of cars has caused an immense amount of coke to remain in yards.

SALES SINCE OUR LAST REPORT.

Coal and Coke Smelted Lake Ore.

500 Tons Standard Bessemer	19.25 cash
500 Tons Off-grade Bessemer	19.00 cash.
500 Tons Neutral Mill	17.25 cash.
250 Tons No. 2 Foundry	18.50 cash.
100 Tons No. 1 Foundry, all ore	20.75 4 mo.
100 Tons Gray Forge	17 50 cash.
100 Tons No. 2 Foundry	19.25 4 mo.
60 Tons No. 2 Foundry	19.00 4 mo.
50 Tons No. 1 Foundry, all ore	21.00 4 mo.
50 Tons No. 1 Foundry, all ore	20.50 cash.

Coke, Native Ore.

200 Tons Gray Forge	17.25 cash.
50 Tons Silvery	19.00 cash.
100 Tons Gray Forge	17.60 4 mo.
50 Tons Mottled	16 75 cash.
20 Tons No. 2 Foundry	19.50 4 mo.
300 Tons Gray Mill	17.25 cash.

Muck Bar.

500 Tons Good Neutral	31.00 cash.
500 Tons Good Neutral	31.00 cash.
500 Tons Good Neutral	30.50 cash.
350 Tons Good Neutral, Extra	31.50 cash.
200 Tons Good Neutral	31.00 cash.

Steel Billets.

200 Tons Billets	29.85 cash.
500 Tons Billets	29.00 cash.

FINANCIAL.

NEW YORK, Friday Evening, Nov. 25.

The Condition of Trade.

The volume of trade has been checked this week by the intervention of Thanksgiving day. The distribution from first and from second hands is generally checked at this season by the near approach of the Christmas holidays, when rather more attention is paid to shopping in retail lines than otherwise. The widely prevailing open weather, not entirely seasonable, is also responsible for some degree of slackness on the part of buyers of heavy weight dry goods, and of other varieties of staples. But the prolonged drouth in the lower Ohio River valley has at last been broken up by copious rains, and the outlook is for a steady improvement in general trade in that region as compared with the past five weeks. The strike of railway employes in Texas is nearing, or is very near its end, and the check to traffic in consequence, mainly at Houston and Galveston, is not expected to continue much longer. The volume of bank clearings last week, at 38 cities throughout the country as specially reported to *Bradstreet's*, was some 18 per cent in excess of the total in the preceding week, but was only 3½ per cent larger than in the like week of 1886, the aggregate being something less than one billion two hundred million dollars. The heavy increase in the total for the week was in large part due to the inflation of speculative operations in wheat and corn, and in railway shares in which there were pronounced bull movements after prolonged periods of dullness. Wheat and corn continue strong this week, but with only moderate advances, although the volume of trading has been heavy. Advances in tin, copper, and petroleum are maintained, and wool remains strong but without change in price. Dry goods, particularly cottons, are in good demand, and some of them have been marked up.

Iron continues relatively quiet so far as new business is concerned, with consumers of pig refusing to put faith in an early advance of prices, as evinced by their hand-to-mouth policy of making purchases. No. 1 Eastern, best brands, are not easy to obtain for prompt delivery. At the West the waiting policy of the buyers is quite as marked as East, but the larger furnaces have orders ahead, and are busily employed. There is some discussion over the advisability of shutting several Eastern (anthracite) furnaces, among which the scarcity of fuel deliveries has caused some trouble. The higher price of coal too has cut down the margin of profit on anthracite iron, there having been no corresponding advance in quotations for the latter.

The Lehigh strike is unsettled, and the operators appear to be firm in their intention not to reopen the mines to the strikers except upon the old scale of wages. Still, the total anthracite production remains in excess of the aggregate to the like date last year, and while consumption (largely industrial as well as domestic) has increased materially over 1886, the reported scarcity appears to be due rather to "scarcity of cars" than to a genuine lack of coal above ground.

The money market continues moderately active, owing to the revival in the speculative demand here and at the West in grain and stocks, which with a loss of over a million in the surplus reserve of the New York banks last week served to strengthen rates a little. There has, however, been no material change in quotations for funds, which range at 3@5c. on call, and at about 6c. on best commercial paper. At various points West and South there is a renewed firmness in the local money markets, in some instances approaching stringency. Collections too are rather less prompt, on the whole, than a week ago.

The Coal Road Stocks.

It having been decided by the United States Court at Philadelphia that the Philadelphia & Reading Railroad is to be taken out of the hands of receivers January 2d, and Central of New Jersey and Buffalo, New York & Philadelphia having secured like good fortune, the financial status of the three important, and, heretofore, weaker coal roads is thereby greatly improved. Philadelphia & Reading's new first preference income 5's have sold at 85c. The coal stocks generally are strong under the stimulus of conditions affecting the coal trade, and the outlook favors its continuance. This week Reading has reacted ⅝, and Jersey Central 1¼; Buffalo, New York & Philadelphia has advanced 5; Delaware, Lackawanna & Western has declined ¼, and Delaware and Hudson has advanced 1⅛ points. Lehigh Valley declared its regular semi-annual dividend of 2 per cent, notwithstanding the coal miners' strike.

Mining Stocks.

The mining market has shown a tendency to harden, and there have been frequent spurts in various shares, based in the main on favorable advices from the Pacific coast; and while this has resulted in a fair degree of animation at times, expectations of permanency in the movement have not been realized, and the market, it is feared, will drag along in its accustomed channel of dullness until San Francisco again leads the movement towards higher prices. Business during the earlier part of the week, while not large, was marked by something of a bustle, but Thanksgiving intervening caused, as usual, somewhat of an exodus of brokers from the city, who thus seized the occasion of utilizing the day given to turkeys and the Saturday half-holiday by holding high carnival outside of the city.

Charles G. Francklyn, the President of the Horn-Silver Mining Company, filed his answer on the 19th inst. in the United States Circuit Court, to which the suit had been transferred from the Supreme Court, New York City, by his attorneys, Butler, Stillman & Hubbard, in the suit begun by David Friedlander against the Horn-Silver Mining Company, Frank G. Brown, William F. Van Pelt, and William S. Hoyt, individually and as officers of the company, and against Mr. Francklyn, referred to in our issue of October 29th. Mr. Francklyn says that he is the president of the company. He denies that the directors of the company managed the financial affairs of the company improperly. He says that no indebtedness is justly due to the company from him, and that he has not wrongfully drawn from the treasury nor has he drawn, outside of the business of the company, any sum of money, and that there are no advances to him by the corporation secured by mortgages or transfers of lands to the corporation.

He admits that certain sums of money belonging to the company were expended for its benefit while he was its president, and that certain directors now say that such sums were expended without formal authority, and that they constitute a debt from the defendant and others, and should be charged to the defendant. Mr. Francklyn denies that the stock has depreciated by reason of any mismanagement by the directors, or that he has taken money and lost it in speculation. He denies all allegations against his management of affairs, and says that there is not a bitter feeling against him on the part of the stockholders, as he was recently re-elected a director by a three-fourths vote of the holders of stock, and was re-elected President of the company. A few sales of the stock were made at from 85c. to 80c.

Application has been made at the Consolidated Stock and Petroleum Exchange to list the stock of the Carupano Mining Company, of Honduras, Central America. The mine has been worked for a number of years, and is said to be rich in gold and silver. The officers are: Mr. F. J. Stevens, of Hartford, President, and S. Y. Myers, Secretary.

El Cristo remained firm. In the beginning of the week the price went from $2.80 to $3, but toward the close the price declined to $2.75.

Castle Creek showed some activity in the beginning of the week, when the price was quoted at from 10 to 13c. Holyoke declined from 10 to 7c.

There was more demand for Ontario, which sold at prices ranging from $26.25@$27. A sale of 400 shares of Stormont is reported at 5c. per share.

Silver King received but little attention this week and sold at from $4.75@$4.50.

The small boom in Rappahannock has "petered" out. The stock is firm, selling at from 21c. to 23c.

Only a few sales of Homestake are reported at $13. Deadwood-Terra was quiet at from $2.50 to $2.66, and Father de Smet remains at 40c.

Considerable activity has been displayed in Standard, and the stock advanced from $1.90 to $2.55, at which price it was selling to-day. It is reported that the company's affairs continue to show improvement. Bodie also showed a higher tendency, and went from $2.65 to $3.25. Bulwer declined from $1.15 to $1. Mono from $2.50 to $2.30. North Standard at 12c.

Quicksilver Preferred has come forward with considerable business, and sold at from $28.50 to $29.25. Common from $6 to $6.75.

The payment of the Taylor Plumas assessment has been extended to December 1st. The stock has been quiet, a few thousand shares selling at from 3@4c. Some parties interested in the company, among others the superintendent, claim that the property is worthless and offers little prospect of developing into a profitable mine. On the other hand these are considered by others to be interested "bear" statements. The facts, we believe, are that a good deal of money has been expended on the property, and it has never earned a dividend.

Amador was quiet at from $1.35@$1.40. Middle Bar was lower at from 41@35c.

Good reports continue to be received from the Brunswick Gold Mining Company's properties. The price of the stock holds its own at from $1.55@$1.66.

Press dispatches announce that the collapse of the Moore-Benjamin mining properties on the Gogebic Range has been prevented by bonding the mines for sums sufficient to pay the indebtedness. The bonds have been taken principally by the stockholders.

It is stated by a party in close relations with Moore, Benjamin & Company that their total liabilities are only $350,000. They owe but $98,000 in Connecticut, and nothing in Boston and New York. The balance is held in Western cities, and secured $2 for $1 at present value of their collateral. They have not failed, nor have they made any assignment. A receiver has been appointed for the purpose of protecting their interests and others connected with them. Moore & Benjamin assert they are worth $5 to $1 owed. The recent attacks upon them and their securities are for the purpose of buying the great Aurora mine.

A mortgage from John E. Burton was filed at Ashland on the 23d inst., in favor of the Central Trust Company, of New York, for $330,000. Mr. Burton schedules his interest in the Anvil, Tontine, Iron King and three other mining properties, forty-six parcels of property valued at $700,000 on Lake Geneva, lots and blocks at Hurley and Chicago, leaseholds valued at $230,000, notes, mortgages, and collaterals. Besides this he gives thirty-six promissory notes, all but two being for $10,000 each, at 6 per cent, due January 1st, 1888. The money raised will be used to extricate the Burton mines from their present financial straits.

Some attention was directed to San Sebastian, the price of which declined from $3.55 to $3.

Sutro Tunnel contributed more than one half of the business of all the stocks dealt in at the Consolidated Stock and Petroleum Exchange—the total transactions amounting to 78,230 shares. The price declined from 36@27c. in consequence of the publication of a circular calling for an assessment of 50 cents per share, of which the holder of the stock is to receive a non-accumulative 4 per cent income bond at the rate of 50 per cent of their face value, the bonds to be issued in denominations of $1000 and $500, and fractional script to be issued for smaller amounts. The money to be raised in this way is to pay off the indebtedness maturing on January 1st next, amounting to $1,000,000. As a matter of fact, the stock is not assessable, and consequently it is optional with the holders of the certificates as to whether they pay the assessment or not, the only apparent danger being that, if not paid, foreclosure proceedings will take place, and thus the stockholders will lose all pecuniary interest in the property.

Consolidated California & Virginia, which opened at $23,50, advanced to $28.88 on Wednesday, and to-day declined again to $24.75. Yellow Jacket advanced from $6.88@$7.25. Sierra Nevada from $6.75@$7.75 Savage declined from $9.50@9.13. Ophir shows but one sale at $12.88. Hale & Norcross at $5.38. Crown Point declined from $10.75 to $10.13. Belcher, from $11.37 to $10.63. Bullion sold at $3.70. Consolidated Imperial advanced from $2.30 to $3.35. Exchequer from $2.10 to $2.20. Julia, from 60 to 80c. Mexican went from $7.88 to $6.50. Union Consolidated, from $5.38 to $5. Utah sold at $2.50.

Mount Diablo appeared again on the list at $4.50.

Security is held by its manipulators at from $1.38 to $2. Monitor was lower and sold at from 17c. to 15c. Lacrosse at from 12c. to 13c. Dunkin from 85c to 87c. Iron Silver, which seldom appears on the list, was quoted at $2.80. Leadville was quoted at 30c. Little Pittsburgh at 33c. and Little Chief declined from 29c. to 25c.

Nothing was doing in the Tuscarora. Sales were made in Navajo at $1; Tornado, $1.10.